SINCLAIR

QL WORLD

Every month £1.45 February 1989

REVIEWS

Biograph
Flight Simulator
Cue Well

HARK! THE HERALD QL SINGS

The MIDI of Miracle — a new interface for the QL

SUPERBASIC

Calculator project starts this month

FRESH INFESTATION

More ROM bugs for your collection

EIDERSOFT QL

86 Commercial Road, Paddock Wood, Kent TN12 6DT 089283 2552

COMBINED MDV T'KIT £19.95
_MDV and ALMDV toolkits on one microdrive

FORTH £29.95
Professional Forth 83 compiler
● Fast and compact ● Many extensions

NEW !
COMPWARE

ALMDV TOOLKIT £14.95
1000 lines of commented source code for mdv header and sector access

1 TO 1 DUMP £5.99
Undistorted screen dump to an Epson FX80 printer

Computer One Professional Monitor NEW 39.95
(Upgrade price 20.00 if you return old cartridge - you need to keep the old manual.)

New Features:
- Symbolic debugging including symbol management.
- Integral 68000 assembler for single/multi line assembly and assembly from files.
- Include files.
- Dual screen debugging.
- Function key control of monitor clones.
- New commands: ass, noass, =, nojob, include, noinclude, nosymbols, noeval, swap, noswap, noclones, noflags, error, escape, sleep, base, ".

All of the above in addition to:

- o Integral dissassembler
- o Tracing of code in RAM or ROM
- o Move and search memory
- o Queue tracing
- o Memory modify and display
- o Breakpoints in RAM or ROM
- o Full job inspection and control
- o Configurable multi-window display

ICE

*LOOK FOR SPECIAL OFFERS

ICE Limited while stocks £26.95p
+ Choice Multitasking Program last £14.95p
+ Toolkit especially for ICE users £14.95p

ICE is a ROM based utility program that turns your QL into an ICON controlled "state of the art" computer. Not only does it add a number of functions not found on a standard QL including calculator and calender, it also makes all basic functions a dream to use.

ICE + MOUSE was £79.95 NOW £59.95p
The Eidersoft mouse combined with the above ICE icon gives your QL the power of the Apple Macintosh or GEM. Mouse control is implemented on all packages that use the ICE system, which gives a very smooth and fast response that will not be outrun. If you already have ICE we offer a £10.00 trade in if you return your existing ICE.

ARTICE OR MOUSEART £14.95p
A keyboard or mouse controlled graphics program. The features include circle, line, box, free hand draw, paintbox colours and brushes, copy, transfer and save image. Epson printer dump, undo, spray can, recolour, text, mode 4 and 8 operation.

ICICLE £14.95p
A multi tasking utility that allows you to set up your own ICONS for the control of programs, including QUILL, ABACUS and a host of other programs. As well as a full ICON editor it includes a printer spooler and printer manager.

DRAWING OFF-ICE £24.95p
3D screen designer aimed at producing true 3D images on your screen. The perspective is automatically calculated to a given vanishing point. This is not some complex co-ordinated program which requires you to work out every point of the 3D object in advance. Requires 3½" disk drive. This program now includes version of mouse art. Expanded memory required.

NEW **PUBLISHING OFF-ICE £24.95p**
Incorporating an exchanced version of mouse art. Everything you need to design your newspaper or publication
Disk + Expanded Memory only required

BOOT 128K £5.99
Run "128k only" programs in your expanded QL

QL PASCAL £29.95
Exceeds the ISO standard!!
● Fast ● Efficient
● Simple to use ● Professional

ASSEMBLER £19.95
The fastest QL Assembler
● Editor ● Linker

PRO-MONITOR £29.95
As monitor plus symbolic debugging (Return old cart + £15 to upgrade)

TYPING TUTOR £14.95
Professional tuition in easy steps
● Speed and accuracy measurement

MULTI-PRINT £5.99
Print multiple copies of files with this multitasking program

MONITOR £15.95
Powerful, full featured debugger
● Many unique facilities

COPYCAT £10.99
Backs up most protected cartridges in no time

MDV TOOLKIT £9.99
Extensions to read/write mdv sectors, headers etc

Task Swopper (Version 2) NEW 19.95
(Upgrade price 10.00 if you return your old Task Swopper manual.)

New features:
- True job cloning. (Saves memory, eg: 9 Psion clones in a 640K QL leaves 400K free!!)
- Ready made and easily customised start-up menu program.
- Automated printer driver selection (useful for program swapping and also for selecting different typestyles from your printer).
- Automated set up of the QL clock minimises typing by remembering the year/month/day.
- Multitasking clock program.
- Compatible with the QL front end program QATS.

All these features, and *Task Swopper* still only uses 10K of RAM, and is compatible with floppy discs, ROM toolkits, RAM discs and useful utilities such as QL Keydefine.

Mega Toolbox NEW 29.95
(Demonstration cartridge - redeemable against purchase: 10.00)

This is not just another run-of-the-mill QL toolkit. It adds over 168 new commands to QL basic, and truly breaks new ground. Extensive and original use is made of the QL's multi-tasking ability, enabling the basic programmer to perform wonders, even if he wants to compile his programs.

Main Features:
- Designed for use by serious programmers and software houses.
- Improved control of QDOS resources (including memory, keyboard, pipes, files, jobs, alarm clocks and tune playing jobs.)
- Windows / graphics (saving, restoring, copying, mirroring - optional compression.)
- New keyboard input driver for better command line editing
- Drawing / text printing commands (eg 3D text), ideal for constructing animated slide-shows for games/advertising etc.
- Dual screen handling (copying, swapping, automated screen mode control.)

Here are just 39 of the 168 new commands: FREE_MEM, ALCHP, RECHP, MCOPY, MFILE, MSEARCH, FACT, DAY$, UPPER$, LOWER$, HEX, BIN, DEC, FILE_LEN, FPOS, GET, PUT, KEYBOARD, ENTER, ACTIVATE_Q, STICK, PROMPT$, JOBS, JOB_STAT, RMOVE, PIPE_ID, CONNECT, SET_FONT, PRINT_3D, MPRINT, EXPAND, HIDE, SHOW, ZOOM, PRINT_X, SLIDE_X, ALARM_X, QTRAP, QCALL...

Expert System Shell NEW 49.95

This is a serious tool designed both to introduce the novice to the design of expert systems, and to be used for serious expert system work. The expert system programmer can construct sophisticated rule based systems and put them into real applications. A tutorial will help you learn how to design an expert system and for ease of use, context sensitive help is provided.

Main Features:
- Tokenised rules save memory (about 100 rules in a 128K QL).
- Precompiled expressions for fast rule evaluation.
- Intelligent searching and prescanning of rule base.
- Boolean and fuzzy logic plus user definable probability relationships.
- Formating of input and output and ability to construct menus for the user.
- Original constructs: FIRST OF, MIN OF, MAX OF, ALL OF
- Conditional operators: =, >=, <=, <>, <, >
- Muluple goal paths... ...and much more.

BIG DISCOUNTS AND IMMEDIATE ADVICE! ! !

ORGANISER

The machine that thinks with you

- Diary £99.00p
- Alarm .....
- Calculator .....
- Address Book .....
- Organiser II CM £139.50p
- Organiser II XP £29.95p
- Finance manager £29.95p
- Dictionary £59.95p
- Comms link £39.95p
- Spreadsheet £19.95p
- 6k datapak £34.95p
- 32k datapak £79.95
- 64k datapak £99.95p
- 128k datapak £9.95p
- Book on Organiserm £39.95p
- QL to Organiser £12.95p
- Leather case for Organiser, battery and datapak £10.95p
- Nylon waterproof protective bag £39.95p
- Holster £69.95p
- Real leather organiser fax. Holds Organiser, fax paper and pens .....

OBASE
A database creator, allows you to create your own database, 6 different field types. Import, export to archive, use main database supplied on 32k datapak. Not copy protected plus free calculator to calculate + -/ and %
£69.95
* Buy a leather fax case and save 10% on any other Organiser purchase

UTILITIES

GRAPHICS CONSTRUCTION KIT £14.95p
A set of utilities that allows you to construct your own pulldown menus in SUPER BASIC.

Q-SWITCH £14.95p
Multi-tasking that permits a quick switch from ARCHIVE to ABACUS QUILL or EASEL, suspending tasks while jumping to another task. Written by the author of ICICLE and KEYDEFINE this is a very popular package

QSPELL £24.95p
A spelling checker for Quill, supplied with a dictionary 0f 25,0000 words and checks an A4 page in 24 secs.

Q-FLASH RAM DISK £14.95p
Allows the user to define ram disk, programs can then be instantly saved and re-loaded. A print spooler is also included to allow you print whilst using the proprams.

QL to PC £29.95p
Transfer your existing files to a PC for use within XCHANGE, PC FOUR or any standard DATABASE SPREADSHEET or WORDPROCESSOR. Price includes software for both machines and cable.

QL to ORGANISER £39.95p
Transfer both ways your existing QL files within exchange. Complete with software and cable.

QL TECHNICAL BOOKS (Set of 7) *Special price to clear £12.95p
PC FOUR for IBM compatibles Our price £69.00p ex VAT

Microdrive Storage Box £4.95p
Microdrive Storage Box with 10 cartridges ... £22.45p
Microdrive Storage Box with 20 cartridges £39.95

GAMES

JUST BACK!!
'SCRABBLE
A great version of an old favourite. One to four players, 8 skill levels, 12,000 word dictionary
Only £12.50
Summer Reduction. Limited time only

BJ RETURNS £10.95p
Is the excellent sequel to QL cavern incorporating many of the excellent features and graphics of the original game

BJ IN 3D LAND £10.95p
BJ is lost again! This time in a 3D maze that will pose a challenge to all (70 screens).

'KARATE Was £19.95 NOW £12.50
Incredible graphics, 18 different movements including kicks, punches and somersaults. Multi screen action, large flicker, free sprites, multi player option, sound effects, keyboard or joystick control.

SPOOK £10.95p
Probably one of the best versions of Pacman for any Micro computer.

GAMES PACK £16.95p
Comprising of ZAPPER, the classic arcade game. Eagle, a defender type game and Citadel where you must unravel the secrets of a quantity as you steer your craft through 50 screens of danger and excitement and, finally, BJ returns

SINCLAIR QL WORLD

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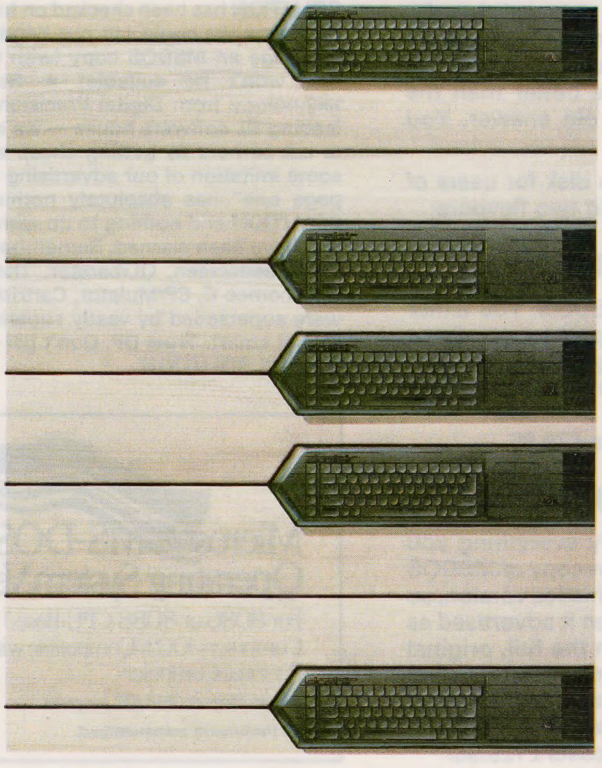


NEXT MONTH

DUET FOR FOUR HANDS
The keyboard report comes home to roost

INSIDE THE DISC DRIVE
Dennis Briggs offers some drive advice

THE SOLUTION — THE SUPREME IBM PC EMULATOR

From the people who brought you such universally acclaimed classics as EYE-Q, EDITOR, LIGHTNING, PROFESSIONAL PUBLISHER, SUPERCHARGE and TURBO, there now comes a program that safeguards and guarantees the QL's future. This program is **THE SOLUTION**.

Incredibly, **THE SOLUTION** makes your QL think it is an IBM PC. For a tiny fraction of the cost of even the cheapest IBM compatible or PC clone.

THE SOLUTION is a full-blown IBM PC AND MSDOS Emulator. It works its magic in the only way that is correct: by unerringly accurate emulation of the 808x/80x86 family CPU ("the chip") and the associated core hardware that is to be found inside every PC and every PC compatible computer (including the Amstrad, Apricot, Atari PC, Brother, Commodore PC, Compaq, Epson, Olivetti, Opus, Sharp, Tandon, Toshiba, Zenith) ever made. And all this is done with our new state-of-the-art software: there is no hardware for you to connect, disconnect, or solder and no hardware to interfere with all your existing QL programs.

So what? So you can run PC programs on your QL, without any hassle or any complication. **THE SOLUTION** auto-boots and that's all there is to it — there are simply no installation procedures, cumbersome or otherwise. Designed and tested by the intelligent, **THE SOLUTION** is for use even by dummies.

THE SOLUTION runs as fast as it is possible for an MSDOS+PC Emulator to run. Amazingly, run on comparable hardware it is faster than the ST one! The speed is more than adequate for everything besides interactive games.

What is the catch? There isn't one. You can now obtain the best-known software in the world — titles from the likes of Ashton-Tate, Borland, Lotus, Microfocus, Microsoft, Pegasus, Sage, Sun, Zortech — plus the huge range of MSDOS public domain programs, and run them on your QL. And you can still use all your existing QL programs too. So if you have an application for a PC, or if you have a PC at the office and a QL at home, or just want to go one better than the Jones's, you don't need any old answer. You need **THE SOLUTION**.

THE SOLUTION is supplied on disk for users of expanded QLs. We provide it in two flavours:

THE VANILLA SOLUTION

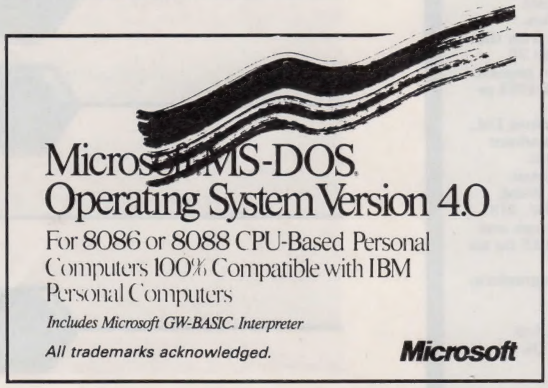
We do not supply you with MSDOS. You either buy your own copy of it — expect to pay about £85 — or utilise one which you already own (please remember that software piracy is theft), later than v3.1ish.
THE VANILLA SOLUTION costs £79.95.

THE CHOCOLATE SOLUTION

We supply you with absolutely everything you need. That includes a brand new copy of MSDOS v4.0 (the very latest bells and whistles version, so recent you won't even have seen it advertised as yet by Microsoft) bundled with the full, original MSDOS manual (not some home-baked handout), full system utilities and the excellent GW BASIC. This is the ideal package.
THE CHOCOLATE SOLUTION costs £129.95.

Technical and General Specification

★ Unparalleled and authenticated IBM PC and MSDOS compatibility ★ Heavily optimised 100% machine code operation guarantees maximum possible speed ★ An incredibly accurate full CGA-standard multi-colour graphics and text emulation (both of these available both directly and via BIOS), with hosts of screen modes supported, and not just MDA (monochrome, text-only and therefore unsuitable for all but trivial programs) ★ Facility for the advanced user to suppress carefully selected error/flag checking: this has no ill effects on most software, and permits even greater speed! ★ The emulator is inherently multitasking, permitting (in addition to direct operation) both QDOS+MSDOS multitasking and MSDOS+MSDOS multitasking — this makes **THE SOLUTION** more powerful than top-of-the-range PCs, and provides potential limited only by your imagination (note that DP programs like EDITOR SPECIAL EDITION can manipulate ANY MSDOS file, whatever the source) ★ BIOS is rewritten in unbelievably efficient, highly-linearised (carefully avoiding all unnecessary subroutine calls), optimal 68000 code ★ Copyrighted unique analysis of instruction group with associated unnecessary flat simulation filtered out and unproductive intermediate activity suppressed ★ A massive 667K is available to MSDOS (more than on most PCs!) if you have TRUMPCARD, 468K if you have a 512K expansion, etc ★ Enhanced mode graphics support, limited only by inherent QL screen resolution ★ Works with any non-obsolete MSDOS version — but remember that most PC programs themselves require a recent MSDOS version ★ Read from, write to and format PC/MSDOS disks, with file transfer to/from QDOS — no extra program to buy ★ Works perfectly with all software that doesn't make hardware-specific calls ★ Copes even with naughty software (by either bypassing, auto-guessing or reporting the errant instruction to you — you select the course of action in advance) ★ Screen, keyboard (+driver), floppy disk, comms + serial ports + printer etc (you can decide what does/uses which) are all supported and are reconfigurable, giving absolute flexibility ★ Mouse support ★ Selectable 80x86 trace mode and timer interrupt, with immediate access to QDOS ★ Not one but two IBM character sets ★ **THE SOLUTION** loves LIGHTNING! ★ Betatested by a menagerie of experienced and novice users — **THE SOLUTION** has been checked on hundreds of the worst programs we could lay our hands on ★ No need to scrounge an MSDOS copy (with the worry that your one won't be suitable) ★ Reliable, trustworthy technology from Digital Precision (DP for short), the leading QL software house — we advise you not to try to cut corners by getting cheap alternatives. Despite some imitation of our advertising wording, the "back-page one" has absolutely nothing to do with **THE SOLUTION** and nothing to do with Digital Precision — you have been warned. Remember, you don't find ads for Speedscreen, QLiberator, The Quill, Front Page, Metacomco C, CP/Mulator, Cartridge Doctor, etc — all were superseded by vastly superior DP technology.
So get smart. Trust DP. Don't get problems.
Get **THE SOLUTION**.



DIGITAL PRECISION

HILARIOUS FOOTNOTE: **We have just received the latest ANT (Emulator), very slow and incompatible, accompanied by an apology from ANT stating (we quote verbatim): "It still contains quite a few problems"! —** ***Well, we told you so.***

THE EDITOR SPECIAL EDITOR

Text handling par excellence

These are the ultimate file–handling programs for your favourite computer. A new concept in hyperspeed information manipulation, Editor serves as a word processor, printer driver, database and programming environment. You name it, Editor does it. Its logic and consistency of approach put Editor in a class of its own. Special Editor only works on expanded machines – it takes the QL to its very limits, and is ideal for handling documents, manuscripts, books etc.

TURBO

The supreme SuperBASIC compiler

Turbo is compatible with the entire syntax of SuperBASIC. Its friendliness, features, tolerance, flexibility and fast operation are legendary. TURBOcharged programs run upto 100x faster than BASIC ones . TURBO is supplied with a general–purpose, two–hundred command toolkit.

PRICES SLASHED!

LIGHTNING

The complete QL speed enhancement system

Lightning accelerates the QL's text, graphics, screen and mathematical operations by mind–blowing factors of up to 14x. No technical knowledge or programming is required. Simple to use, but with many bells and whistles - 78 fonts, new nul device, user–variable precision, character-drain, modechange suppression...

DESKTOP PUBLISHER DTP SPECIAL EDITION

These programs provide wysiwyg document design, with a huge. number of RAM and device resident lo–res and hi–res fonts, continuously variable X & Y magnification, compatibility with Editor, Quill and Eye–Q, a preview function, comprehensive graphics facilities, flexible cut & paste, pixel justification etc. Both versions require expansion RAM, and Special Edition is disk only. The Special Edition is supplied with a free copy of grafiX, the well–known PDQL printer controller. Both versions work best with Eye–Q and Editor.

PRICE SLASHED!

DIGITAL C

A C compiler for beginners

Truly portable, but carefully tailored and optimised to produce fast, concise code on the QL. No cash crop conversion this!

SUCCESS

The supreme CP/M Code Emulation System

Converts the QL into a fully compatible CP/M operating environment. No ifs, buts or almosts. Run thousands of the world's favourite programs on your QL NOW! Emulates Z80 too!

For full program specifications refer to the July 1988 QL World

£10 off The Editor and/or ACT Special Edition if bought with anything else

IDIS

The first intelligent disassembler for the QL

The ideal disassembler for beginners – with IDIS you do not need to be an expert to crack other people's programs

3D PRECISION

A dream to use

Provides every facility for swiftly designing and manipulating three dimensional objects in real time. You have complete control over perspective, magnification and position, and you can create lines, surfaces, objects and worlds (groups of objects). Needs extra RAM..

MEDIA MANAGER SPECIAL EDITION

NEW

Media Manager is a very early DP release with oodles of functions. However, the design and user-friendliness of the system was not quite up to the standard of Digital Precision's other programs.
Consequently, we have spent a great deal of time rationalising and improving Media Manager, making it much easier to use, much faster, more powerful and more flexible. The result – Media Manager Special Edition. A classic release, a must for everyone who uses the QL to store things of value. Not that MMSE is just for when things go wrong – it is a manager too, with a host of medium control functions. And if you can program, we've supplied SuperBASIC extensions for every conceivable device control.
Additional features include the facility to read from, write to (and even format) IBM MSDOS/PCDOS disks and Atari TOS disks - two-way access both at sector-level and at file-level.

MORE SUPER SPECIAL DEALS

we want to encourage more and more users to experience for themselves the stunning acceleration imparted to the operation of all Digital Precision programs (and everyone else's programs) by LIGHTNING.
Programs that particularly benefit are editiing/word processing programs, databases, graphics/CAD programs, desktop publishers, compilers, games and programs with a high computational overhead (like astrological systems).
We will give a 10% discount, additional and supplementary to all other discounts, for any purchase of two or more programs, if one of them is LIGHTNING. This discount applies to the total price – it is not just 10% off LIGHTNING but 10% off the lot!

DIGITAL C SPECIAL EDITION

NEW

Digital C Special Edition has all the features of the much-acclaimed Digital C System, plus:
★ **Direct access** to all QL traps and vectored utilities is provided.
★ **Machine code** has now been used for writing all the standard library functions – this maximises execution speed and minimizes code size.
★ **Huge programs** can be compiled – no 64K or other code size limit.
★ **Many new fast** library functions including SCANF are supplied.
★ **User selectable size** optimisation gives the choice of efficient 16 bit and flexible 32 bit addressing.
★ **Long integers** are now supported.
★ **Long pointers** are now supported.
★ **Long constants** in octal, decimal and hex are now available.
★ **User friendliness** is improved.

PROFESSIONAL PUBLISHER

NEW

Digital Precision is proud to announce an all-new, top-of-the-range desktop publishing system.

Professional Publisher has all the features and controls you require to produce output of the very highest quality.

Professional Publisher has ALL the features of Desktop Publisher Special Edition, plus the following:

★ **Linked windows...** Any number of windows can be 'invisibly' connected in a sequence determined by you so that text flows from one automatically into the next. Windows can be of any shape.

★ **Wraparound graphics...** Any graphic can be placed on a page and text can be made to automatically flow around the graphic. Pixel-proportional spacing and the integrity of columns will be maintained – the graphic can be of any shape and can wholly or partly overlap any number of windows. The user may define any polygon (up to 64 sides) to demarcate the desired border of the graphic, which need not coincide with its actual outline.

★ **Full mouse compatibility...** Smiling mouse owners can start smiling! The incredibly silky smooth feel of this system, when either used from keyboard or mouse, has to be experienced to be be believed. It comes from our special scrolling and cursor-handling routines, handwritten in machine code. We suggest you use the system from the keyboard first, and then go in for a mouse if you feel the need to.

★ **Style and layout designer** allows you to create any number of layout templates, which contain details of columns, margins, gutters, breaks, guides etc. This permits the easy creation of multiple pages.

★ **No more fiddling** around with cursor keys for exact positioning – text can be snapped into guides.

★ **Full compatibility** (and now absolutely hassle free!) with ASCII files (say from Editor Special Edition), Quill_doc files and Quill_lis files – now with complete preservation of paragraphing, indentation, tabulation, superscripting, subscripting, italicising etc. Any size files can be handled – Pro Publisher has an on-screen skip/preview/chunk routine!

★ **Huge range of fonts supplied** (hundreds) – memory resident and disk resident – with sizes ranging from 8x8 to a gigantic 48x48! User-adjustable (pixel accuracy) descender position, character spacing, X and Y axis widths etc. In addition there are 26 graphic fonts!

★ **Page dimensions specifiable** either in pixels or millimetres – up to an enormous 960x1600 pixels and down to a tiny 48x48 pixels. Inch and mm rules provided.

★ **The whole of the ASCII set** is now supported – this is very useful if you want lots of special symbols or if you want to support non-English characters.

★ **Fingerprinting** is supported.

★ **A virtually infinite** selection of fill textures, with font patterns, graphics, or whatever you choose.

★ **There are 256 paint brushes**, with a unique programmable overlap (1/3/9 pixels) function.

★ **Automatic shading** and grey scale conversion of colour screens.

★ **Automatic interpolation** of graphics and fonts.

★ **Automatic bending/stretching/resizing** of graphics.

★ **All Boolean functions** supplied for brushes, fonts, graphics and freehand drawing – AND/OR/XOR

★ **Cut & paste** is supported both TO AND FROM the page itself, saved screens and compressed screens – this incredible support of all permutations gives unheard of flexibility!

★ **Full support for kerning** and pixel justification, including user-definable % line usage, user-definable maximum and minimum inter-character spacing and inter-word spacing (preventing the ugly spread of characters or words on a line when the first word on the next line is a very long one), preselectable/defeatable auto-hyphenation, auto-indent control, dropcaps, left/right/centre/off justification etc. etc.

★ **Walkdown menus** (selections either by a single keypress or by a moveable bar, you decide), context-sensitive help, very greatly enhanced user-friendliness.

★ **8/9/24 pin printers**, laser printer support, output any part of the page, individually vary X and Y axis magnification, user-selectable print density and number of passes.

★ **Professional Publisher** is supplied on disk for expanded QLs.

Digital Precision want to particularly acknowledge the skills of the ace programmer Andrew Astrand and his dedicated team.

REMINDER: Taken out a QL WORLD subscription yet?
Yes, our non-UK friends, we mean you as well. Do it NOW!

IDIS SPECIAL EDITION

All the features of the much-acclaimed IDIS Intelligent disassembler – but even more intelligence!
This remarkable Special Edition, Only available to users of expanded QLs, has the amazing ability to recall earlier decisions while in a 'trial' disassembly mode. This greatly reduces the amount of help the system requires from you – usually to zero! Also, no longer will you need to answer the same (or similar) question more than once. Also added are facilities for dumping in hex/ASCII, default responses to startup interrogation, automatic resequencing of absolute addresses, non-destructive windowing etc.

NEW

UPGRADES

To upgrade from one version of a program to a later version of the same program, send us the cartridge/disk and £10. Except in the case of Special Edition Editor owners upgrading to the latest Special Edition Editor, do not return your manual to us.
To upgrade from a program to the Special Edition of the program (say from the standard Editor to Special Editor), send us the cartridge/disk, manual and the difference in current advertised price between the two programs, plus £10. For this purpose we will consider Professional Publisher to be an upgrade from the Desktop Publishers and Professional Astrologer to be an upgrade from Super Astrologer.

For example:
* To upgrade DIGITAL C to SPECIAL EDITION C send us £40 (£49.95-£29.95+£10)
* To upgrade an early SPRITE GENERATOR to the current version send us £10

PRODUCT AVAILABILITY ROSTER >>>>
Everything available NOW except:
Media Manager SE: 25th Jan 1989
THE SOLUTION: 25th Jan 1989

DIGITAL PRECISION

MEDIA MANAGER

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Public

Can any *QL World* readers supply me with a copy of *Fantasia Adventure,* published by S B Software? The author has given written permission for this game to be placed in the public domain.

Richard Alexander,
CGH Services,
Cwm Gwen Hall,
Pencader,
Dyfed,
Cymru SA39 9HA.

GLP

Further to your mention in Technical Helpine in the November, 1988 edition, I wonder if you may have setting up details for a Centronics GLP printer with the QL? What I need to solve my problem would be the settings for each of the eight parts to the two DIP switches, whether SER1 or SER2 sockets, and the details for the printer driver table.

Any help would be appreciated from somebody who knows how to solve the connection.

Richard Steele,
50 St. Giles Gate,
Scawsby,
Doncaster,
DN5 8PQ.

Editor's comment: This is a case where the best solution is for somebody who uses the GLP printer with a QL to contact Steele direct, so we have included his address.

Editor's notebook

AT the time of writing — bearing in mind that this is four to five weeks before *QL World* reaches its readers — we have heard no further word from Gap Software. Peter Chambers' company, well-known for the *Front Page* desk-top publishing software among others, is no longer available by telephone, and letters and callers at the company's premises have received no response.

We do not know what has happened to Gap. We hope that whatever has happened will be repaired in time. At the moment we can only continue hoping.

Just before Christmas I had a revelation in a blinding flash of light — not attributable to the office celebrations but revolutionary nonetheless. "I can", I thought, "ask them not to send us any more programs for The Progs until the end of April, by which time we should have dealt with any design changes and whittled down The Progs waiting list noticeably."

Much as it goes against the grain to say "send nothing yet", I think this is appropriate; you spend a little longer in polishing your productions while I concentrate on turning round the ones we already have. Do not worry if you have just sent us a program — it will join the queue as usual. You may even be number 200 but the programs may as well spend their waiting time on your computer as in my filing cabinet.

100 ASA

In the November, 1988 edition of *QL World,* Dr A J France presented an interesting article on producing slides from the QL. I use a similar system for the same purpose but have found that "almost any film" will not do. After much experiment, I have found that 100ASA film with a one-second exposure gives better results than faster film at half a second. It is certainly better to over-expose the film slightly.

Dr K N Williams,
Wimbledon,
London.

Editor's comment: I agree. We have found that although acceptable results can be obtained from different films with a little experiment, 100ASA gives consistently satisfactory results.

Pixels

I was interested to read about the Brother HR-5 printer in the December issue. I have been using the RS232C version for two years and find it very satisfactory. The carbon-film ribbon seems satisfactory with a wide range of papers and I now use cheap jotter pads from W H Smith. It certainly is not necessary to use costly Brother paper.

Anyone who uses the HR-5 with an Easel screen dump will find that 16 pixels are not printed on the left and right of the page. For Easel this does not matter, as the margins are always blank, but if you are borrowing gprint_prt for your use — or using the *Eye-Q* graphics program — you need to keep the edges clear.

Software which lets you vary the pixel width of your page will enable you to print the maximum 960 dots per line.

The amount of space between lines is set with the dip switches, as explained in the article, or by sending codes to the printer. This "line pitch" setting can be varied in small steps without the need to fiddle with the switches. One-ninth of an inch is usual for graphic printing, leaving no gaps between lines. If your circles normally print-out egg-shaped, you can cheat and set the line pitch to 7/72in., slightly less than 1/9in. This squashes the image vertically and is not a good idea if your screen also contains text.

Chris Adams,
Moseley,
Birmingham.

Flyable

I was interested in your announcement in the September edition under Chocks Away, about the Ekotek program *The Simulator* which I have since bought. Thank you for publishing the address.

The prompt way the company dealt with my order was an example many others might well follow, especially as it was imported.

The program is really excellent and very flyable and though it is not said to be for pilot training, I would think it would give anybody a good idea of what it is about.

The program is well worth buying in my opinion, although if anybody buying it wants a shoot-'em-down job, they will be disappointed. If they want to fly under bridges, across lakes and round mountains, they should enjoy the program.

S J Parker,
Haywards Heath,
W. Sussex.

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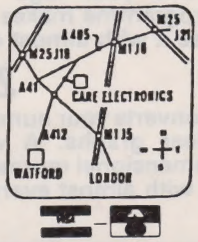

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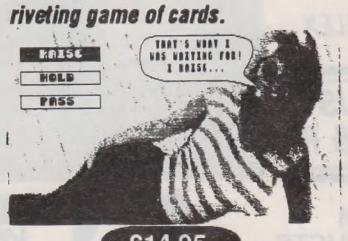

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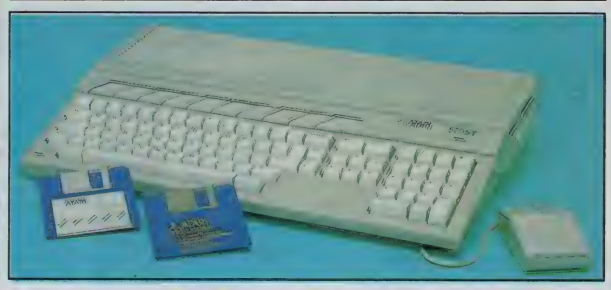

The value for money offered by the Atari ST range is reflected in the Explorer Pack featuring the 520ST-FM computer with 512K RAM. The 520ST-FM computer now comes with a built-in 1 Mb double sided disk drive as well as a free mouse controller and a built-in TV modulator. The new 520ST-FM Explorer Pack includes the 520ST-FM computer, the arcade game Ranarama, a tutorial program and some useful desktop accessories. In addition, if you buy the Explorer Pack from Silica, we will give you the Silica ST Starter Kit worth over £200, FREE OF CHARGE. Return the coupon for details of our Starter Kit and of the full ST range.

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Z88 Computing	£10	QL Service manual	£20

Other QL titles available - phone for details -

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QL JS 2.35 s/w	£169.00
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QL SCENE

PDQL goes to C

PDQL has three new packages for the QL and Thor lined up for release. *Basic C-Port* by Chas Dillon is designed to convert SuperBasic programs to C — full K and R. Once converted, the C version can be compiled for use on the QL, or DiscOVERed to an IBM environment and compiled for use there. The program will cost £59.

TexTidy by Dave Walker is a program for converting Quill files to ASCII text files ready for DiscOVERing for use with *The Editor*. The program will also convert DiscOVERed *WordStar* files to plain text and into Quill_doc format. Conversion may be by the disc or by individual file. The price is £10.

Hardback and *Finder*, both by Chas Dillon, comprise a package for hard disc users. Hardback provides an index enquiry routine which takes the user through the directory and subdirectory structure, while Finder locates elusive files hidden in sub-sub-directories by name or by part of name. It can also identify all files containing a user-specified string such as Dear Sir. The price is £25.

Contact PDQL, Unit 1, Heaton House, Camden Street, Birmingham B1 3BZ. Tel: 021 200 2313.

Compware

Eidersoft QL has announced that it is now able to sell Compware products. Eidersoft can be contacted on 089282 2552 for further details.

Here comes the Plod

CGH Services, publisher of *QL Adventurers' Forum*, has released an icon-driven adventure by Alan Pemberton, author of *Adventure Playtime* and *From the Tower of Valagon*. The new game, *Starplod*, runs on QLs with 128K or more of memory, using either a television set or a monitor, and is capable of multi-tasking. The program has media and RAM load save and can be configured for disc or Microdrive.

Starplod costs £8 on disc or Microdrive with a detailed manual, or £6 to purchasers of QL Adventurers' Forum. A further £2 discount is available to users providing their own media, postage and packing. Most standard disc formats can be used but 5.25in. discs must format at 1,440-1,400 sectors.

Contact CGH Services, Cwm Gwen Hall, Pencader, Dyfed, Cymru SA39 9HA, Tel. 055934 574 for information or orders. Payments must be made in sterling.

In Spain

A new QL users' group has started in Spain. The address is: QL-Egabro, Apartado de Correos no. 76, 14940 Cabra (Cordoba), Spain.

Digital Precision Special Editions

Following fast on the recent spate of special edition programs, featured in the January, 1989 issue of *QL World*, Digital Precision has released further information about its new IBM MS-DOS emulator program named, in classic DP tradition, *The Solution*.

DP states that it has always been in the solution business. With increasing interest in MS-DOS emulation on the QL, and competition from other programs in the field coming to the market, DP will have the chance to prove itself again.

The Solution will turn the QL into an IBM-compatible computer able to run software designed for the PC and its clones, effectively making the QL into a low-cost PC clone complete with multi-colour CGA support, MS-DOS V4.0, GW Basic and full system documentation.

DP points out that the system has advantages over the dedicated PC-compatible, allowing multi-tasking, QL-style, between MS-DOS programs. DP says The Solution is faster than comparable programs on the ST and other machines because of the intelligent pre-processing of incoming instructions.

Digital Precision, 222 The Avenue, London E4 9SE. Tel: 01-527 5493.

Fractal growth

A fractals enthusiast is starting a newletter on the subject. *Fractal Report* will contain practical programs for generating fractal images on specific home computers or on PCs and compatibles and machine code routines for specific microprocessors. It is hoped the newsletter will also contain general interest articles and readers' letters.

The first newsletter will be sent free to anyone who is interested. Articles should be sent, wherever possible, camera-ready on A4 paper — single-spaced, one side of the paper only, with headlines typed or Letraset — but articles in other forms will be accepted in exceptional circumstances. Authors published in the first issue will receive the next five issues free if there is sufficient interest.

Contact John de Rivas, West Towan House, Porthtowan, Truro, Cornwall TR4 8AX.

Rhythm of life

Biograph by Imaqulate Software, reviewed in this issue, is a new program which calculates the user's biorhythm chart for one month or six months at a time. Some people believe that awareness of physical, intellectual and emotional cycles taking place in their bodies helps them deal with everyday life more effectively. The Japanese are said to take biorhythms seriously. There is also entertainment value in working out your cycles and matching them with others.

The author has been producing biorhythm charts for more than two years and has refined the program in the light of experience. An instruction manual and, for the first 500 buyers, a paperback book on biorhythms, are included in the £20 price. For more information contact Imaqulate Software, 42 Albion Street, Broadstairs, Kent CT10 1NE. Tel: 0843 62130.

QL SCENE

Sub up

QL Sub, the user group which offers support for the QL, Thor, ICL One-per-Desk and Merlin Tonto, has added more staff to its business centre to help users calling for sales or assistance.

Callers are asked to make an appointment before visiting to ensure that the service they require is available at the time. For more information, contact Sub at PO Box 3, Shildon DL4 2LW. Tel: 0388 450610.

Quanta board

An official Quanta bulletin board has been set up for QL owners on 0543 377493. The board will be on line from 10am to 7.30pm seven days a week and from 10am to 2pm on Saturdays, on V21 (300 baud) and V23 (1,200/75). Viewdata software is needed.

The sysop is David Park, who will be using *QView*.

Data driver

ICS Electronics has released a QL driver program for the popular PK-232 multi-mode data terminal, used by amateur packet radio enthusiasts among others. The software supports all the data modes of the PK-232 and allows facsimile images to be fed to printer but not to screen.

Information from ICS Electronics, PO Box 2, Arundel, W. Sussex BN18 0NX. Tel: 024 365655.

Emsoft success

Emsoft Ltd, organiser of the Alternative Micro Show at Aston Villa Sports Ground, is pleased with the results of the first national specialist microshow and has already made plans for a show on November 11, 1989.

The intention was to bring together under one roof a number of microcomputer cultures which tended to suffer from eclipsing by current mass-market models at national computer shows, or which were no longer able to support a truly national show in their own right. The larger scale of the Alternative Micro Show was intended to be attractive to general computer supplies as well as specialists.

The Dragon, Tatung Einstein, MSX, Lynx, Texas TI, Oric, Jupiter Ace and Enterprise were represented, as well as the QL. Commenting earlier on the lack of QL dealers scheduled to appear, an Emsoft spokesman said: "We had not thought of including the QL until somebody pointed it out to us recently, so we did not really have time to approach the QL suppliers and promote the show to them properly.

The 1989 show will be held at Bingley Hall, Staffordshire Show Centre, Stafford, with almost 100,000 sq. ft. of space. Emsoft is planning demonstrations and an equipment auction among the attractions. Further details can be obtained from Emsoft Ltd, Poplar Lane, Copdock, Ipswich, Suffolk IP2 0AB. Tel: 0473 690729.

text87 VERSION 2.00

Just over a year since the release of **text87**, we are proud to present the new version 2.00 of our advanced wordprocessor. Version 2.00 offers all the features of the earlier versions of **text87** plus the following:

- ★ On-screen pixel-accurate justification.
- ★ Optional display of the ruler for the cursor line.
- ★ Optional display of the name of the current typeface in addition to the WYSIWYG display of founts.
- ★ Up to 10 typefaces (selected by the user from those supported by the printer drivers) are available for quick insertion in the text. The Program remembers these selections for the next editing session.
- ★ 10 screen display founts are now supplied with the Program including 3 sans-serif, 4 Roman, superscript, subscript and italic founts.
- ★ New 80 page manual.

text87 is extremely fast. Running on the Atari ST with the QL emulator, it outperforms most multifount wordprocessors running on the ST, AMIGA or the Macintosh Plus and matches the fastest ones. Even on the much slower QL it is more than a match for many of those wordprocessors. On QLs with 512k memory expansion **text87** can handle large documents of over 400k characters.

text87 can print multiple-line headers and footers, print in up to 4 columns, and change line spacing in different parts of the text. Many dedicated and generic printer drivers are supplied for different families of printers. Once selected, the printer driver is automatically loaded and becomes an integral part of the Program. With any Diablo or Qume compatible daisywheel printer (including Epson, Brother, Juki, Panasonic, etc) **text87** can handle multiple daisywheels, proportional spacing, bold, underlined, superscript and subscript text even on model, which do no provide commands for these features. On Epsom and compatible dot-matrix printers different character widths and styles can be mixed on each line with microjustification. Proportional spacing is also available with some dot-matric printers. The number of different print styles supported by each driver varies between 48 and over 200. The whole range of QL accented characters is supported on all Epson and IBM Proprinter compatible dot-matrix printers.

fountext88 is the graphic printer driver for **text87**. Used with Epson compatible dot-matrix printers, it provides desk-top publishing facilities with thirty high-quality founts (not ordinary QL founts) in different styles and sizes up to 72 pixels high. With **fountext88** you can use graphic founts without the limitations in text editing and document size imposed by page makeup programs. **fountext88** can load up to 32 founts and allows you to use them in any combination in the text. On QLs with 512k expansion, maximum text size can be up to 300k depending on the founts loaded. **fountext88** can be configured for two print densities and a choice of single pass or overlapping double pass print. A special 24-pin version is supplied at no extra cost.

founted89 is the new graphics editor for **fountext88**. It allows you to create new founts of up to 84×96 pixels per character or capture screen images saved from QL drawing programs for insertion in your documents. Using **fountext88** these captured images appear on the screen and on paper to pixel accuracy.

2488 is a set of state-of-the-art text-mode printer drivers for Epson and NEC 24-pin printers. When used with **2488**, **text87** is the only QL program that can take advantage of the advanced features of 24-pin printers such as multiple character founts, proportional spacing, double width, double height, condensed, etc. For example, the driver for the NEC P2200 supports 12 typefaces each in 5 sizes and in a range of up to 12 further combinations of highlights, resulting in over 500 different print styles!

text87	**£45**	**fountext87**	**£25**
founted89	**£15**	**2488**	**£15**
Complete edition: text87 + fountext88 + founted89			**£80**
Other software:		**Qram**	**£29**
Taskmaster	**£25**	**Qtyp**	**£29**
Spellbound	**£29**	**Qpac II**	**£19**

Prices are inclusive of airmail worldwide. Payable by cheque, Postal Order, Eurocheque or credit card. Please specify cartridge or disk system.

text87 is very compact and works perfectly with a minimum 64k of memory expansion. **fountext88** requires at least 128k expansion. **text87** is compatible with all QL memory expansions and disk interfaces and most multitasking software.

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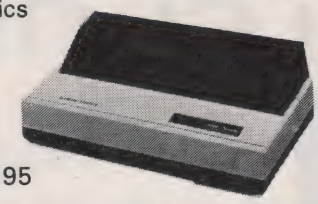

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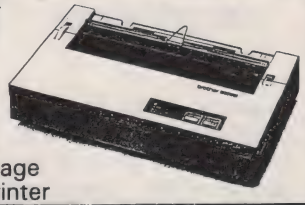

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TECHNICAL HELPLINE

We continue with the second part of the Dennis Briggs guest spot, in which he faces some hard truths about add-ons and upgrades to standard QL hardware and software.

Olivetti search

I referred to the Economy Drive article in QL World, *May 1987, for a note of the supplier where I could buy my economy Olivetti disc drive. D.S. Enterprises could not be traced through the telephone directory and enquiries confirmed that D.S. Enterprises has probably ceased trading.*

Enquiries at Olivetti have not so far been successful in tracing an alternative supplier. Part of the problem is that the drive is not identified in the article.

Is it possible that you know of a second source, or may be able to identify the model number of the drive to further my enquiries?

David Barrie, Motherwell, Scotland.

The disc drives supplied by Dave Storton were exactly what they said in that they were economy ones, in that they had been used. No doubt it is possible to repair or resurrect these drives but I doubt if Olivetti has the information on these units, as that company has gone through many changes since the drives were made.

I have a Shugart-manufactured drive, also a Rank Xerox drive which are very similar, so perhaps Olivetti badged someone else's drives.

The connection from the interface is included along with the signals the disc drive expects to receive and while they will no doubt be correct, some interfaces could really do with the latest Tony Tebby ROM being fitted to be fully effective. Contact QJump at Cambridge with details of your interface for advice. The disc drive now has to interpret this information correctly and it appears that some of the logic on the board is a little hit and miss as it recognises both sides of the disc and steps correctly to give 1,440 sectors, knows only one side of the disc to give 720 sectors or double steps and reads both sides or double steps and reads one side as 360 sectors.

The snag with this type of drive unit is that it was largely mechanical, while the later ones which are more electronic give greater reliability and repairs are relegated to lump swaps.

To try to do anything with a disc drive means having a good 20MHz double-beam oscilloscope with special features and £75 worth of alignment disc. A £400 disc exerciser is also a vital tool, so it means that it is certainly not a quick DIY job.

I think it would be better to start again with new drives which can be bought, if you read the advertisements in the electronic magazines, for £30 up, depending on size with 5.25in. DS/DD for about £60 uncased.

Second-user drives are around for about £20 and mine has lasted four years without hiccup.

The disc drives you have will probably work first time on the QL as most computers apart from Apple and Commodore use Shugart-standard drives. It does not mean they have to be made by Shugart but that the connections are to the Shugart standard.

The first thing to do is to open them to see if they have the more normal edge connector and, if they have, giving them a whirl connected to a QL. There are some links on the board which may need changing and remember to put a standard disc in the drive.

The first thing to look for is the motor to start and then stop after a QL re-set. If it does you are halfway there. Refer to the diagram of the links which should enable you to get it working with a little experiment.

If you have two drives the terminating resistors must be present only in the last drive of the chain. The QL will support up to four drives if you can afford the cash and the space. Terminating resistors look like an IC but they have 14 pins and have 180ohms marked on the top.

A suitable cable is available from Maplin Electronics, Rayleigh, Essex.

Cortex left-over

I have a QL with Trump Card. I also have a disc unit intended originally for a Cortex computer but never used. The unit is an MDD 220/Canon. Can I use this with the Trump Card and a separate power supply and where can I get the necessary cable?

D. J. Sanderson, Portland, Dorset.

Long Quill

I have a QL which has been expanded externally with the Miracle 512K Expanderam. One of the major reasons for buying the expansion was for the ease of document handling and manipulation when using Quill; from this viewpoint it has been successful. I am now raising 1,500- to 6,000-word documents and experiencing a problem saving to cartridge. The problem is intermittent; probably 80 percent of the time a document will be saving or appearing to save for long periods.

I have left it to whirr for up to 30 minutes at a time. To stop this lengthy saving process I have to remove the cartridge from the drive. If I take a directory of the cartridge normally I find the document name present and a large number of sectors taken up, indicating the document is complete.

When attempting to load this document I get the message which tells me it is not a valid Quill document; on the very rare occasions it loads normally I have had no problems with smaller documents up to 300 words, yet.

I have tried freshly-formatted cartridges, thinking it might be a storage problem but this has had no discernable effects. I have even removed the expansion, but the same problems still occur.

Roger Smith, Southampton, Hampshire.

The total capacity of a Microdrive cartridge is about 100K and it is easy for long Quill documents to exceed or approach this figure. Depending on the complexity of the layout, Quill will store a good deal of extra information to enable the original format to be retrieved. This extra information is invisible to the operator unless you read it into an *Editor* program when the apparently extra meaningless characters are on the bottom of the file. Without this extra information, Quill cannot recover the file so it tells you it is not a valid Quill file.

The practice of keeping long documents in one piece, especially on cartridges, is not one I would recommend; the more

TECHNICAL HELPLINE

CONTINUED

sensible approach is to keep smaller sections and then eventually merge them for printing. If you look at any book or magazine you find that this is normal practice so that paragraphs, pages or chapters can be worked on separately.

Think of a daily paper where many reporters are working on the same edition in separate locations until it finally comes together a few minutes before printing. The loss of one piece does not then become a disaster.

Back to Quill now to see what the problem is. Version 2.35 has been improved to overcome some earlier problems, with Turboquill and Turboquill+ being even better. If you are using Quill version 2.00 an update is called for. Further, if you are using Quill for lengthy word processing it would be advisable to consider purchasing disc drives. You could also consider using the Editor program for word processing, as it has many advantages over Quill, especially when the documents become large.

The process of allowing Microdrive cartridges to continue whirring will not improve the tape or the mechanism, as the continual running is in effect telling you that there is something wrong. The program is attempting to follow your SAVE instructions but there is no room on the tape. If you must have this lengthy document, why not SAVE it to a RAM disc, which is very fast, but remember you will lose the lot when you switch off or the QL crashes? If the drives continue for a long time, just snatch the cartridge from the drive while it is running. It does no harm and allows you to recover your sanity.

To sum up, I suggest you update the software. In this way you will avoid giving the QL indigestion. Other word processing packages on other computers will not allow this situation to arise as they will not run without disc drives. One of these units on the QL means that all the saving problems would disappear at a stroke, as the machine becomes more professional.

Mode code

I have been using for some time a QL coupled via a serial to parallel printer interface by Data Link Edinburgh to a Seikosha GP 500A printer. This has worked very well on all Psion programs except Easel.

I would now like to use graphics fully but cannot obtain any information for Seikosha or Data Link as both companies have no information on 'old' equipment.

I am not a computer buff but could set-up the printer data on the Psion 2.3 programs. Your help on the required data or any advice would be appreciated.

John Skelton,
Dalgety Bay, Fife.

The 8056 printer needs special codes sending to it to put it in graphics mode. They are

CHR$(27), CHR$(75), CHR$(0) and CHR$(2).

Type-in the following demonstration program:

```
10 OPEN£3,SER1:BAUD
   1200:CLEAR:N=0
20 PRINT£3,CHR(27);CHR$
   (75;CHR$(0;CHR$(2)
30 FOR I=0 TO
   512:PRINT£3,CHR$(N):
   NEXT N
40 PRINT£3,CHR$(13):
   CLOSE£3
```

If you need further details in regard to this printer when used with the QL, write to A. Beveridge, 110 Navite Park, Ballingry, Fife KY5 9NJ.

QL to Apple?

I have QL with the Miracle Systems Trump Card and have acquired 5.25in. Apple disc II drives.

Is it possible to connect them to Trump Card? What are the pin-out details? Where does the power source connect? I have followed your article and subsequent column Drives on the Cheap and it is these which make me consider that the possibility might exist.

A. Dryden,
Totton, Southampton.

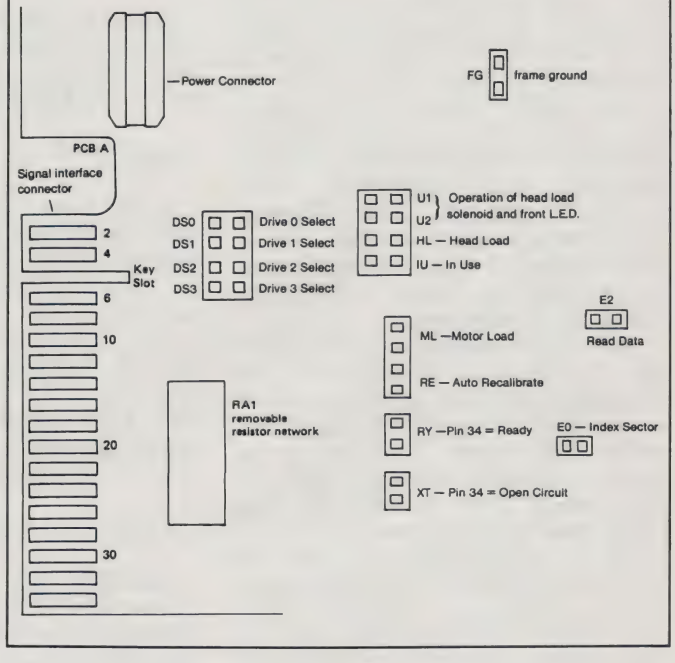
Apple computers are a little different from the rest of the more popular ones in regard to the disc drives, as are Commodore drives. Apple drives use hard-sectored discs; that means that they have many more index holes in the disc. With a soft-sectored disc there is only one index hole, so the disc for one type of drive will not work in the other.

It is always worth looking at the drives to see if they have the more normal edge connector and, if they have, giving them a whirl connected to a QL. There are some links on the board which may need changing and remember to put a standard disc in the drive, not one of those Apple ones.

The first thing to look for is the motor to start up and then stop after a QL re-set. If it does you are halfway there. A diagram of the links is supplied which should enable you with a little experiment to get it working.

Theoretically it will not work due to incompatability problems but drive manufacturers cannot make drives for one make of computer, so they provide these links to enable the drive to be re-configured for virtually any machine.

Link guide



BUGS AT LARGE

Tame hacker Simon Goodwin tracks another batch of bugs which afflict all QL systems, plus secret priority levels, and undocumented commands which let you use cursor-control and random access files on any unexpanded QL

In three previous articles I have revealed the results of four years' research into the idiosyncracies of the QL built-in software, the Qdos operating system and the SuperBasic interpreter. To date I have found and explained 88 bugs in the QL system.

This is an update to my original articles, which were published in the August and September, 1987 and June, 1988 issues. Since then I have found 14 new bugs, bringing the total to 102. I have also found more about the Microdrive write-protection fault mentioned in September, 1987.

There is no sure definition of a bug. I have concentrated on quirks of the QL system software which cause apparently correct programs to give unexpected results, or no results at all. In some cases programs which should not work are prone to do bizarre things. I count these as bugs, although arguably they are undocumented features. Some of them are even useful.

All complex systems contain bugs. Hardware manufacturers are curiously shy about admitting them, apparently on the basis that what you do not know will not hurt you. This encourages naive users to place unreasonable reliance on inherently fallible systems. In fact, bugs are rarely a problem if you are forewarned. All most users want to know is how to get the result they need without getting into trouble.

Some system bugs may cause other programs to fail, so I have included technical information to help software developers guard against the most common problems by defensive programming in their own code. Where relevant, I have discussed the implications of the bugs for people intending to compile their programs.

This list deals with idiosyncracies inside the QL. Most of these concern the SuperBasic language or the associated collection of routines called Qdos. Some of the most obscure bugs occur in the second processor software which is programmed on to the 8049 IPC chip rather than the main system ROMs.

All QL programmers write new and original bugs as a matter of course but they are outside the scope of this article. So far as I can tell, all the new bugs occur on every version of the QL. The last five are concerned with the pair of linked QL processors. All the others stem from mistakes in the 48K QL system ROM.

(* Bug 89 — RENUM *)

When you RENUMber a program the QL automatically adjusts references to line-numbers after RESTORE, GO TO and GO SUB commands. Unfortunately it does not alter the parameters of resident procedures which refer to line numbers; they include commands like RUN, SAVE, LIST and EDIT.

If you need to re-number a program with RUN in it, use GO TO [line] instead of RUN [line]. If you write programs which LIST or SAVE parts of themselves, you can not re-number them automatically. You must fix the LIST or SAVE statements. Unfortunately that is just the kind of program it is useful to be able to re-number.

(* Bug 90 — NETWORKING *)

The QL is incapable of writing an empty 'packet' of data over the network. If you try to make it do this, the whole machine locks up. It is easier to run into this bug than you might expect. Imagine you have opened a network file in the usual way, with:

```
OPEN #3, NETO-1
```

Then you realise you do not want to write anything to the file, or have nothing to write yet. Being tidy-minded, you type:

```
CLOSE #3
```

At that point the QL freezes, trying to write a zero-length block. The same thing can happen if you supply the device name NETO-1 to a program which tries to write an empty file.

This bug was found by David Oliver of CST. His fix is not very elegant; the Thor XVI locks up for 30 seconds if you try to write a zero-length block, then normal service resumes, accompanied by an 'Xmit Error' report.

(*Bug 91 — TOP PRIORITIES *)

According to all the published documentation, QL task priorities are numbers between 0 and 127. The higher the priority of a task, compared to that of other tasks running at the time, the larger the share of available processing power used to run that particular task. It transpires that priorities greater than 127 are allowed. The system call MT.PRIOR (TRAP #1, DO=11) accepts higher priority values, in the range 128-255.

Most people set priorities with toolkit commands like the Turbo Toolkit SET PRIORITY or Tony Tebby's SPJOB. SET-PRIORITY follows the book and rejects priorities greater than 127 but SPJOB passes the low byte of any integer value to MT.PRIOR. Thus you can use values above 127.

Negative values work, too. SPJOB 0,0,-1 sets the priority of SuperBasic (task 0,0) to 255 in the JOBS list. Other negative values −2 to −256 correspond to priorities from 254 down to zero.

LIST TASKS in Turbo Toolkit shows non-standard priorities as negative values, whereas the SuperToolkit JOBS command shows them as positive. I tested the new priorities by running three compiled SuperBasic integer print loops at the same time. One ran at a priority of 255 and the others at the default priority, 32. The high-priority task received about five times as much processing time as each of the other two. This matches the results for similar ratios of conventional priorities, like 8, 8 and 63, so it seems that the non-standard values work as an extension of the normal range.

(* Bug 92 — MICRODRIVE FORMATTING *)

Microdrive formatting fails at once with an 'in use' error if any Microdrive is running when you issue the FORMAT command. This can stop SuperBasic unexpectedly if you write to one drive and FORMAT another soon after, while the computer is still verifying files which have just been written.

You also run into trouble if you try to add files to a cartridge and fill it. You cannot re-format the tape to get some more space until the system has finished checking the data it managed to write, even though you have indicated that you want to wipe the cartridge.

To avoid the 'in use' report, check the system variable SV.MDRUN before issuing a format command. PEEK (164078) gives you the number of the currently-running Microdrive, or zero if no drive is in use. The procedure SAFE-

FORMAT, in listing one, will format any device, checking SV.MDRUN if necessary.

(* Bug 93 — SCROLL quirks *)

Explained how the CLS command could recognise undocumented parameter values. Non-standard parameters are accepted and give results which seem bizarre at first but correspond to internal QL system calls.

The SCROLL keyword has a similar but superior feature. SCROLL does much the same thing as CLS but expects a second parameter eight greater than the CLS equivalent. For instance, SCROLL 0,24 has the same effect as CLS 16 which, in turn, works like the documented command POINT 0,0. All three call the system routine SD.POINT.

SCROLL is more useful than CLS because it accepts an extra parameter — the number of pixels to be scrolled. This is passed to Qdos in register D1. Several other calls expect parameters in D1, so we can use SCROLL as an alternative way to pass values to the system. For instance, try:

```
FOR X=0 TO 255,7 : SCROLL X,17 :
PRINT "Hello";
```

In this case the SCROLL command passes the value of X to SD.SETIN, with results which are interesting but not particularly useful. We can do better.

(* SECRET RANDOM ACCESS *)

Microdrives and discs allow random access to file data. You can wind back and forth through a file, re-reading or re-writing information, with no need to CLOSE and RE-OPEN the file every time you want to move backwards and no need to read intervening information as you move round a file.

This is very useful if you are writing a data-handling program, as it means you can extract data from anywhere in a file without the system having to fetch irrelevant data.

The TRAP #3 keys FS.POSAB and FS.POSRE are recognised by every QL and let machine-coders move the file pointer to any ABsolute or RElative position. There are apparently no SuperBasic commands to move the file pointer; you appear to need a Toolkit command like SET-POSITION.

This is a problem if you want other people to use your SuperBasic. You cannot rely on other users owning a particular toolkit. All toolkits soak some RAM and that is particularly precious on an unexpanded QL.

Packing

Hackers may be amazed to learn that many QL users are still struggling in 128K and they are in particular need of improved file-handling. Would it not be pleasant if we could find a way to use random access, on any QL, without a Toolkit?

It transpires that SCROLL can do the job. SCROLL #3,N%,42 allows random access to a file open on channel 3 — on disc, RAM-disc, Winchester or Microdrive. This calls FS.POSAB, setting the file pointer to the value of N%. SCROLL #3,0,42 re-winds to the start of the file, SCROLL #3,1,42 points after the first character, and so on. Listing two illustrates a simple random access program. It was tested on a JS QL but should work on other models. The first line opens a file and the second fills it with 10 sample lines of data, each seven characters long including the 'enter' code at the end of each line. Then a SCROLL command re-winds the pointer to the start of the file without closing it.

Loops

A REPeat loop is used to read and display each line until the end of the file is reached. The EOF function works well with random access files; you get an 'end of file' error, as you might expect, if you try to set the file pointer to a number greater than the total length of the file.

The final loop lets you select any record by number, using random access to find, read and print the appropriate line from the file. Type 10 to stop the program.

It is feasible to use SCROLL to position the pointer and PRINT new data into the middle of a file. The characters printed over-write the old ones at that position, so it is a good idea to use fixed-length records. The file is extended if you print at the end but you cannot insert characters in the middle of a file without over-writing what was there previously.

Unfortunately, SCROLL expects integer parameters, so you cannot use SCROLL 42 to move more than 32 down a file. SCROLL #3,n,43 might cure this by allowing relative moves with FS.POSRE. In practice it is rejected by the poor checking in the SCROLL keyword code and gives a 'bad parameter' error.

(* Bug 94 — PAN possibilities *)

Once I had investigated the SCROLL and CLS bugs it seemed worth checking PAN in case it allowed access to other system calls. PAN uses the same technique to convert its parameter into a Qdos trapkey but it adds 27 to the parameter value. PAN #c%,0,124 has the same effect as AT #c%,0,0.

All these keywords are meant to handle parameter values between 0 and 4, so they use shared code which checks the value and rejects it if it gives more than 4 when taken modulo 8. SCROLL and CLS add 32 and 40, so they both reject the same values, but PAN adds 27, allowing access to different system routines.

PAN lets you turn cursors on and off without a Toolkit. PAN 0,115 turns the cursor on in the default channel, while PAN 0,116 turns it off again. These instructions are vital when writing compiled multi-tasking programs which use INKEY$ or PAUSE; if a task does not display a cursor it cannot be selected for input with Control C.

To make PAUSE and INKEY$ work correctly, put PAN #0,0,115 at the start of a task. Note that the default channel for PAUSE and INKEY$ is #0; Sinclair did not reveal this.

Listing 1 - Safe microdrive formatting.

```
DEFine PROCedure SAFE-FORMAT(device$)
IF LEN(device$) > 4
  IF device$(1 TO 3)=="mdv"
    REPeat poll: IF PEEK(164078)=0 THEN EXIT poll
  END IF
END IF
FORMAT device$
END DEFine SAFE-FORMAT
```

Like SCROLL, PAN passes an extra parameter to Qdos in register D1. We can use this to call FS.POSRE, passing a relative offset for the file pointer. You can access any part of a long file by using SCROLL 42 to get to a known place, then PAN 40 to move fowards or backwards from there. PAN #,N%,40 passes the integer N% to FS.POSRE. N% is the offset from the current position in the file, so:

```
SCROLL #3,30000,42: PAN #3, 20000,40
```

positions the file pointer after the 50,000th byte in a file. Use PAN 40 repeatedly if you need to wind more than 64K down the file.

It would be pleasant to be able to 'truncate' a file, discarding characters after a certain point so that space could be re-used. You may find that PAN #3,0,48 will truncate the file on channel #3 after the current position but this relies on the undocumented system — call FS. TRUNC, TRAP #3, DO=75.

Unfortunately, FS.TRUNC was a real afterthought rather than something which was not documented. Standard QLs do not recognise FS.TRUNC; you need the Sinclair QL Toolkit, SuperToolkit 2 or a disc expansion to make this call work. They include an extra command TRUNCATE, so there is not much point using the PAN version unless you want to be deliberately obscure.

(* Bug 95 — WINDOW parameters *)

WINDOW does not check the number of parameters you pass to it. Quanta members who discovered this bug hoped that the 'undocumented' parameters would allow extra control over windows but this is not the case. The WINDOW code uses only its last four parameters, plus the first one — the optional channel number — if the parameter list starts with a hash. The other values are ignored.

If you put extra parameters accidentally in a WINDOW command it can be difficult to determine what has gone wrong, unless you know about this minor bug. The keyword code could be fixed by adding a check on the value in D3 after calling the parameter-fetching sub-routine.

(* Bug 96 — DLINE channel *)

DLINE allows an optional, undocumented channel parameter. If you put a hash and a channel number between the command and line details you can re-direct the 'automatic listing' which normally appears in channel 2 when the program is changed. It is difficult to imagine how this could be useful.

(* Bug 97 — CHARACTER CODES *)

The CHR$ function is meant to convert a number between 0 and 255 into a character with the corresponding code. In fact, it accepts any integer value from −32768 to 32767 as a valid parameter. The resultant character depends on the value of the bottom eight bits of the integer.

This bug is unlikely to cause problems as it does not affect correct programs; it means that some technically-incorrect programs produce useful results. For instance, consider listing three, a useful snippet of code which compresses an integer value, X%, into a two-character string.

This is useful when packing numbers into fixed-length records in a file. If you did not compress the value and PRINTed it normally, it would occupy between two and seven characters, depending on the value. The packed representation uses a fixed length of two bytes for every value, saving space in most cases and making it easy to skip over values.

Note that the code must handle negative values of X% separately and the second character code must be reduced modulo 256, to ensure that the parameter value never strays from the range 0 to 255. You can manage with faster and simpler code, like this:

```
RETurn CHR$ (X% DIV 256) & CHR$(X%)
```

The first CHR$ expression takes negative values in its stride, because of the bug. The second part does not need the MOD because CHR$ ignores the top eight bits of its parameter.

The TURBO SuperBasic compiler has its own fast code for CHR$, to avoid the need to call the Sinclair slow resident function. This bug is duplicated deliberately in compiled code to preserve compatibility. The parameter of CHR$ is always an integer, so the code is not slowed by the need to handle the bug correctly.

Q-Liberator does not generate its own code if it can use an existing resident routine. In this case it is exactly compatible with the interpreter, because it calls the interpreter routines for every resident command or function it executes.

(* Bug 98 — POKE PARAMETERS *)

The POKE and POKE-W commands have a similar bug to CHR$; again this quirk can sometimes be useful. To be compatible with the ZX Spectrum, the POKE and POKE-W commands let you store signed values as well as unsigned ones. For instance, you can POKE X,-1 or POKE-2 X,65530 even though strictly the parameters of POKE should be in the range 0 to 255, or −32878 to 32767 for POKE-W.

Ignores

All POKE commands accept any 32-bit long integer value as a second parameter without complaint. POKE ignores the top 24 bits of the value and POKE-W ignores the top half. The effect is that, like POKE-L, POKE and POKE-W allow any parameter values in the range plus or minus about two billion. For instance:

```
POKE 131072, 131074
```

stores the value 2 in the first byte of QL display memory. The low byte of the value 131074 is 2 and POKE ignores other bytes.

Once again, Turbo duplicates this bug for compatibility in compiled programs. Turbo code converts both parameters from floating point values, as SuperBasic has no 'long integer' data-type. This

Listing 2 - Random access without a Toolkit.

```
OPEN-NEW #3,MDV1-TEST
FOR L=0 TO 9 : PRINT #3;"Line:";L
SCROLL #3,0,42 : REMark Rewind
REPeat show
  INPUT #3,A$
  PRINT #3,A$
  IF EOF(#3) : EXIT show
END REPeat show
REPeat scan
  INPUT "Enter record No. 0-9:";R
  IF R<>INT(R) OR R<0 OR R>9 : EXIT scan
  SCROLL #3,R*7,42
  INPUT #3,A$
  PRINT #3,A$
END REPeat scan
CLOSE #3
```

makes it slower than it would be if POKE and POKE-W worked only with integers but the Turbo code is still much faster than the Sinclair resident POKE routine.

(* Bug 99 — BEEP INTERACTION *)

Very high-pitched notes produced with BEEP interfere with keyboard polling. If you use BEEP 0,0 to generate a continuous tone you will find it difficult to type-in anything else while the tone sounds. BEEP 0,1 is not bad but key-strokes are still lost while the beeping is active. The problem occurs because the keyboard is read by a program in the 8049 second processor.

The same program also generates sounds by sending pulses to the QL squeaker. When the 8049 is making a high-pitched note it does not have sufficient time between clicks to scan the keyboard.

There is no easy fix for this, as the faulty code is buried in the IPC, which includes ROM, RAM and processor all in one chip. NEC makes a user-programmable version of this chip, the 8749HC, but you will need a few specialised tools to disassemble, patch and re-program the IPC. In practice it is much easier to avoid sustained use of pitches 0 and 1.

(* Bug 100 — KEYROW *)

Another IPC bug is concerned with keyboard polling. The QL manual says it is tricky to detect three or more key depressions with the KEYROW function but reassures the reader that SHIFT, ALT and CTRL do not interact misleadingly with other keys. Unfortunately this is not true. Compware programmer Francesco Balena has discovered that the arrow keys can interfere with CTRL and ALT.

If the UP and LEFT arrow keys are pressed at the same time, a common event in games and joystick programs, the CTRL and ALT keys are indistinguishable. Normally KEYROW (7) returns a set bit for each of the keys but if you press UP, LEFT and ALT you get the same KEYROW pattern as for UP, LEFT and CTRL; in either case, both the bits for CTRL and ALT are set, even though only one of them is pressed.

The only way to avoid this problem is not to use diagonal cursor movements in conjunction with CTRL or ALT. This bug is probably a documentation error rather than a real coding mistake, as it would be rather inconsistent if the QL could cope with those key combinations without trouble.

(* Bug 101 — BEEP/KEYROW CRASHES *)

If a task if loaded or unloaded while the SuperBasic interpreter executes a BEEP or a KEYROW instruction, the whole computer is likely to crash. BEEP and KEYROW call MT.IPCOM, passing the address of a parameter table stored on the user A7 stack. This is bad programming because SuperBasic may re-locate the stack in memory at any time if memory is needed for other tasks.

If Basic moves during BEEP (IPC 10/11) or KEYROW (IPC 9) the table address is invalidated and gibberish may be passed to the IPC. In the original Qdos documentation, designer Tony Tebby warned: "IPC communication is completely unprotected. The command must not contain any errors or the entire machine will hang up.

Listing 3 - Integer packing with CHR$.

```
IF X%<0
   RETurn CHR$(256+X% DIV 256) & CHR$(X% MOD 256)
 ELSE
   RETurn CHR$(X% DIV 256) & CHR$(X% MOD 256)
 END IF
```

Interpreter

To fix the interpreter you must re-define the BEEP and KEYROW keywords. The machine code could be the same apart from a switch into supervisor mode — freezing multi-tasking — during the IPCOM call. The easiest alternative is to compile the program. This cures the problem because the stack of a compiled program never moves while a task runs.

(* Bug 102 — SERIAL OVER-RUN *)

Chas Dillon and Tony Price report a problem in the handling of serial queues. The second processor can get its pointers in a muddle, when running fast communications programs, if it is asked to do something else at the same time, like generating a sound or recognising a keypress.

Characters are delayed and jumbled inside the IPC, so that they reach the buffers in QL main memory out of order. It is not an easy bug to demonstrate as it depends on precise external timings but it is consistent enough to make fast serial input irritatingly unreliable. The bug occurs even if you use 'handshaking' hardware to regulate the flow of data.

If the IPC is disturbed while reading from a serial port it may lose several characters or introduce a 'lag' so that each new character received causes an earlier character to be passed from the IPC to the main processor.

A proper cure for this bug would involve re-programming the 8049. It might be wiser to circumvent this by building a dedicated QL serial port but that would still take a great deal of hardware and software effort. Alternatively, use a slow data rate like 300 baud or buy a Thor XVI.

(* UPDATE — MICRODRIVE WRITE PROTECTION *)

In my September, 1987 bug list I mentioned that write-protecting a Microdrive does not stop the system trying to write to it.

In fact, the QL tries to write the data eight times but each time the low-level code aborts because the tape is write-protected. This means the drive runs for a little more than a minute, then a 'bad or changed medium' message appears.

At the time I suggested that you might cure this problem by using IPC call 1 to test the write-protect status of the currently-turning drive.

I have since tried this and it does not work. IPC call 1 has a bug in it which means it always indicates that the tape can be written-to, even if it is write-protected. This is a really annoying bug, because you cannot re-program Qdos round it.

The only way to avoid spurious bad or changed medium errors is to ensure that you never try to write to a cartridge which has the plastic 'write-protect' tag removed. It is for you to check this, because the computer cannot check for you.

(* FUTURE BUGS *)

This is certainly not a definitive list of QL bugs, although it covers all the problems I have been able to analyse in detail. If you have extra information about these or other QL bugs, please share your discoveries by writing to me, care of *QL World*.

Information
Program: Flight Simulator.
Supplier: Ekotek Datasystems, P.O. Box 140, 7570-AC Oldenzaal, Holland.
Price: Enquire.

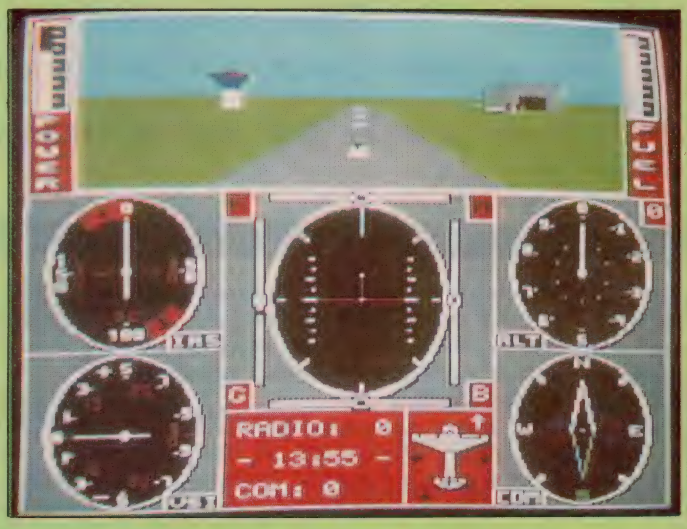
SOFTWARE FILE

Flight Simulator by Ekotek Datasystems does not claim to be a 'teaching' simulator but it reminds Andrew Armstrong of a real aircraft.

Flight Simulator is, as its name implies, a program which simulates flying an aircraft. It is supplied copy-protected and *QLiberated,* on Microdrive. It allows you to make up to five copies, so with reasonable care you should be able to keep at least one working copy for as long as you want to use it.

The *Flight Simulator* screen displays the main instruments which you will find in the cockpit of a modern light aircraft, with a window at the top showing the view through the aircraft windscreen or, optionally, a map. At the start, the aircraft is on the runway ready for take-off. Following the test flight instructions, you start the engine and raise it to full power. Then you take off the brakes and accelerate along the runway. When you reach take-off speed you pull back on the control column and you are flying.

There is plenty to learn at first and if you were to try anything too clever in the first flight the aircraft would crash before you had finished reading the instructions. For that reason the test flight involves taking off from one airfield, a period of straight flight, and a landing at another airfield which appears ahead of you. Even so, I made a rough landing the first time.

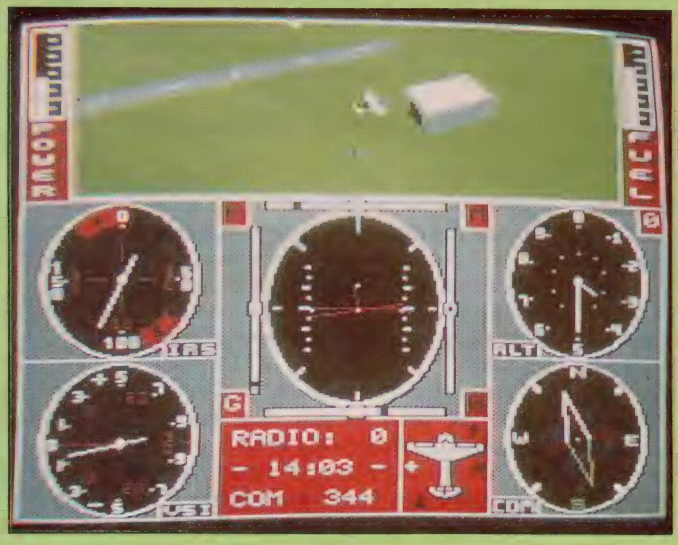


Three levels

Three levels of difficulty are available. Level 0 is very simple. The steering is easy because the aeroplane returns to level flight if the controls are set to neutral. At level 1, banking continues, once initiated, until cancelled deliberately. Returning the controls to neutral will not do. On level 2, a wind is added to this to make straight end level flight in the direction you want difficult.

I found the game interesting and absorbing. From my experience of being a passenger in a private aircraft and of assisting with the nevigation, I could judge that there is a fair degree of realism in the game. There is certainly enough territory to fly over — and get lost — in the four "worlds" provided. Each "world" or map covers 50km.× 50km. and can contain up to five runways. That represents the maximum which can be fitted in a QL memory without expansion.

Having said that I liked the game, I found, some aspects which I did not like. First, the response is sometimes too slow to be realistic. By the time you have looked to the side and back in a tight situation, the aeroplane could have crashed. On the other hand, the response of an aircraft to its controls is slower than that of a car and the speed of the major controls seemed reasonable.



Zooming in and out on the map seemed the slowest operation.

Sometimes the program seems to ignore the keyboard for a time. Perhaps the interrupts are disabled temporarily while the program is busy but it can be disconcerting to press a key and find that nothing happens. That, combined with the slow response, led me to switch the map display on and off several times while waiting for the display to change. Eventually I learned how long it takes and stopped thinking about it.

A monochrome graphics mode is available, in which the objects in the window are shown in outline instead of as coloured shapes. This is supposed to improve the graphics resolution, though I preferred colour, but it does not seem to speed things.

The instructions were generally good but they explained how to refuel by advising that the aircraft must be parked on the refuelling mark without describing such a mark. No doubt regular fliers are familiar with such things but the rest of us are not. A little trial and error solved the problem.

The "worlds" are wrapped round; if you leave the right-hand edge of a map you will enter the left-hand edge at the corresponding point. It can be faster to make a journey by taking the hyperspace route from side to side or top to bottom of the map but I think that is cheating. You can also get lost if you try this, although the radio beacons will help you find where you are — good practice for those going for their instrument rating.

In conclusion, this is an interesting program which is good enough to give the novice some idea of what is involved in flying. It is not intended as a serious simulator — they cost tens of thousands of pounds upwards — but it makes a credible attempt. The program is intended only for amusement but this is enhanced by the good simulation.

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Information:
QL Midi Pack
Miracle Systems, NBC, Dean Road, Yale, Bristol BS17 5NH.
Tel: 0443 317772.
Price: £78 (export £73).

MIRACLE MIDI

Mike Lloyd tunes his QL to Miracle Systems new Midi interface and finds a relative harmony.

Computing is categorised as a science but the best computer programmers are not necessarily blessed with an aptitude for mathematics and the sciences. Instead, they share a surprising affinity with painters, musicians and other artists.

This might explain why so many musicians have taken to computerised synthesisers and why so many programmers have taken up musical computing. It may also explain the existence of a large number of people who own both a QL and an electronic keyboard. Miracle Systems has discovered this market and is now supplying its Midi controllers in great quantity.

The history of computer-controlled music is brief. In the early days the driving software and the interface between computer and instrument were exceptional to the manufacturer and perhaps even to the instrument. This situation was not sensible and so a universal interface specification was agreed by the Japanese music industry and adopted throughout the world.

Cheaper

The standard is known by the now-familiar acronym of Midi or Musical Instrument Digital Interface. Midi has played an important part in reducing the cost of electronic instruments to the point where the cheapest Midi keyboards can be found for around £100.

Midi breaks down note information into its constituent parts, such as note on, note off, pitch and octave, and translates the data into binary messages which can be sent to a computer for storage and editing, or which can be forwarded directly to another instrument. Midi is fast enough to work in real-time, otherwise its usefulness would be strictly limited to the recording studio.

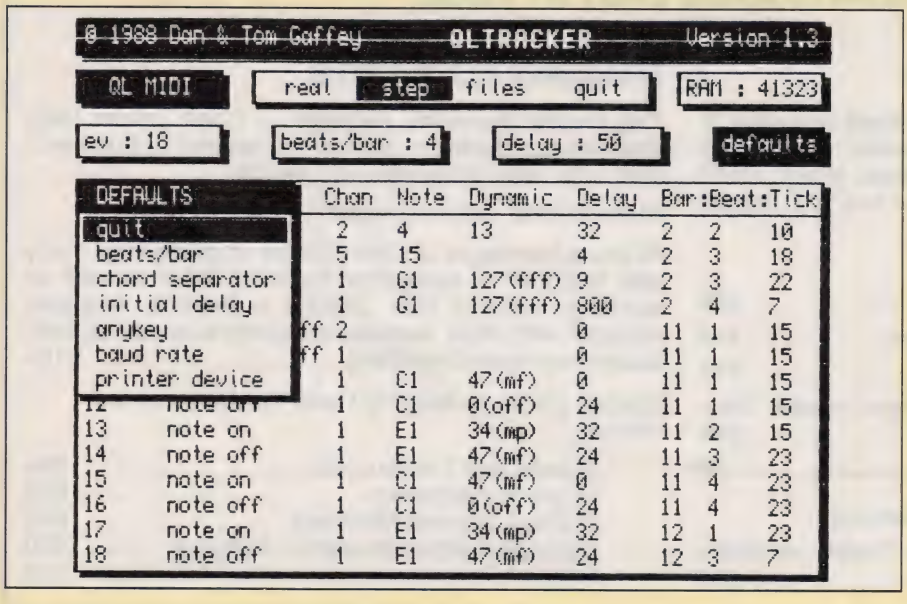
Most keyboard instruments have three Midi ports labelled IN, OUT and THRU to allow data to be transmitted in both directions and to be passed on in a network of Midi devices.

Up to 16 keyboards, drum machines, keyboard-less synthesisers — called voice expanders — and even guitars can be linked via Midi and any one device can control one or more of the others. Viewers of the BBC-2 series Rock School will have seen a demonstration of a quitarist playing piano, a drummer playing bass guitar and a pianist playing drums — all without leaving their original instruments.

While Midi copes with all kinds of dynamic information it does not transmit actual sounds. They are still produced by the instrument and output via an amplifer and speakers in conventional fashion. The Midi data is purely digital squeaks, rather like those found on tapes of Spectrum software. The computer replaces the finger on the piano key or the plectrum on the guitar string.

As is the nature of computers, they can be played more accurately and faster than humanly possible but with some loss in sensitivity of expression. If a guitar is the musical equivalent of an artist's studio, a Midi system is a factory.

My music factory consists of a Technics SX-K500 digital keyboard and a Kawai K1m, a keyboard-less digital synthesiser module. They are linked via the standard 5-7-pin DIN socket Midi ports. Without Midi it would be impossible to get sound from the Kawai synth. Both instruments are then linked to an amplifier and speakers with standard guitar leads. The network was completed recently when I borrowed a Miracle Systems Midi interface and its QL-Tracker software.



The Miracle package includes a chip-filled box which connects into the QL ROM port, where it dwarfs the ROM packs normally resident there. To this are added two long Midi leads, more than adequate to stretch from the computer to a keyboard without requiring them to be on top of each other. The software is provided on Microdrive cartridge but can be transferred easily to disc. The system requires extra memory on the QL and Miracle will include its RAM extension for an additional sum.

With the software on the Microdrive there is a short user guide in Quill format. The guide does not include an overview of what Midi is about and suffers for it, leaving concepts such as "omni mode" unexplained and needlessly repeating the relationship between beats to the bar and Midi "ticks".

The BOOT program on the supplied Microdrive launches into the back-up sequence. This admirable idea is spoiled only by the unannounced formatting of the working copy medium, destroying anything already stored on the disc or Microdrive being used. A conventional boot program is substituted for the working copies of the program.

Having created a working copy on a disc, the normal start-up procedure was effortless but a little slow and punctuated by worrying periods of silence. A reassuring message such as "Loading software" would have been welcome. The delays seem to occur as the software is adjusted to suit the speed of the QL memory expansion unit. The opening screen is an attractive graphic of a keyboard. It is replaced by a menu page obviously inspired by the Digital Precision Turbo compiler.

Menus are very important to a program because they represent the interface between the user and the program. A good menu is a gateway to program features, whereas a poor menu is an obstacle. Despite looking like the excellent Turbo, the QL-Tracker menu is much less friendly. It relies on a complex hierarchy of sub-menus, some of which gave too many options for comfort.

Selection is via cursor movement, left and right for the main menu and up and down for subordinate menus. Pressing the spacebar, rather than pressing RETURN, selects an option. I would have preferred all menus to have worked consistently and for the ENTER key to have been accepted as an alternative way of selecting options. My suspicion is that the design was developed for use with a mouse. My hope is that it is improved in future versions.

The main menu has four options, allowing the user to select real-time or step-time data entry, file-based activities or exit. The default values for tempo, delay, intro length, metronome, beats to the bar and so on are also displayed. They can be changed only be selecting a DEFAULTS option in the real-time menu.

The important real-time options are PLAY and RECORD. If the synth is set to Channel 1 the chances are that recording can take place without adjusting any of the Midi setting. QL-Tracker can issue a synchronising clock tick but cannot be controlled by an external clock. After playing a piece of music the recording is terminated by pressing the letter "S" on the QL keyboard. Before selecting PLAY to hear the stored sequence it is a good idea to disconnect the IN Midi lead.

Quantize

Once a raw recording has been made it can be edited on the computer. Any slight deviations from strict tempo can be adjusted with the QUANTIZE option. Options also exist to filter out aftertouch data, remove all inputs relating to a particular channel, clear the entire data set or transpose the notes into any key.

Much of the editing power which makes a sequencer so useful is offered in the STEP TIME option. Midi data can be listed to the screen or to a printer in the format shown in the accompanying figure. Incorrect notes can be changed for correct notes and whole sequences can be removed or repeated. This means that a chorus and verse need be recorded only once and then repeated in any combination to produce the whole song.

Chip spurned

The way information is displayed makes it difficult to identify where segments of music begin and end. There is no equivalent to the FAST FORWARD and REVERSE options found on more expensive sequencer software. Understandably, Miracle has made no attempt to use the weird QL sound chip to bring some life to the forbidding columns of data.

Mistakes can be corrected or scores enhanced by using the ADD option, which involves the most complex series of submenus in the package. The user chooses between entering information via the instrument or via the computer. The former is generally much easier than the latter. One can add notes or alter channel information, such as setting values for polyphonic and omni modes, program change and local control.

The STEP submenu also allows users to select useful things like a chord separator, which identifies simultaneous events in the listing. Rather strangely it also includes the printer menu. Other non-Midi communication is handled via the third main menu option, FILES. Files can be loaded, saved and deleted, and the default device can be re-defined.

How did the finished output sound? This, of course, depends entirely on the skill of the performer and the quality of the sound producer. I admit to having interminable problems getting the Technics keyboard to talk to the sequencer before finally blaming the unusual Technics Midi implementation and giving up. On pure synthesisers rather than electronic keyboards these compatibility problems should not occur.

At its simplest level, QL-Tracker is easier to use than a tape recorder but its editing and reviewing facilities are crude and unfriendly, although their potential power is not in doubt. This is not a great criticism bearing in mind the price of the software and the lack of a credible alternative and it is unfair to expect the kind of facilities available on sequencer software for other computers costing close to £100.

Much more important, the hardware and software performed reliably throughout the lengthy trial period and the quirks of the menu system soon became familiar. As a basis for future enhancement, QL-Tracker is a fine piece of software and is firmly recommended for any synthesiser musician with a QL.

SOFTWARE FILE

Information:
Product: Cue-Well 2
Price:
£10 (£6 for upgrade from previous version)
Supplier:
Rob-Roy Software
94 Teignmouth Road
Clevedon
Avon BS21 6DR

Bryan Davies gets down to some housekeeping with a new front end, while Shirley Jane Peters shoots 'em down with a Galaxians-style arcade game.

Described as a "fast and friendly front-end for any QL", this package is a set of routines for performing the usual housekeeping functions — Directory, Copy, Rename, Format — plus Load & Run and Exec. The package is installed as a Keyword, so that it remains even if you issue the command NEW. There are various packages available which perform the same functions and the question is what *Cue-Well 2* offers to distinguish it from the others? Obviously, the price is attractive. What is apparent when it is run is that the Directory function is unusual — you can make comments on any or all files to remind you what they are for.

The software is supplied on disc or cartridge, with an easily-read A5 size instruction booklet. As always, the first step should be to make a back-up copy; the manual does not assist this process by advising you to put both the master cartridge and a blank one into the same drive but the cloning process works if the blank is put into mdv2_ and the master into mdv1_, the initial screen gives the correct destination device.

The copy can also be made from mdv1_ to flp1_ or fdk1_ — hard disc. The disc version added to the error in the instructions by offering the choice of cloning to "flp1_", "FLP1_", or "FDK1_". Either of the first two choices resulted in the routine attempting to format the master disc which, fortunately, was permanently write-protected. It would be necessary to alter the disc clone routine to enable copying to flp2_. I hope the errors noted here and in the next paragraph will have been dealt with by now.

To install the package you re-set and put the cartridge/disc into drive 1 to boot up. The copy made from cartridge to flp1_ was not usable on its own because the references to mdv had not been changed to flp during the cloning process but the cartridge copy booted correctly.

The initial screen tells you to type C2 and Enter to access Cue-Well 2 at any time. The next screen gives re-assignments of the function keys, F1-F4 providing directories of mdv1/2 and flp1/2 and F5 allowing Cue-Well to be "re-designed". A free-memory indicator appears on this screen, showing 770-780K for my 896K QL, *Ice* is fitted to this system and normally shows 830K available, indicating that Cue-Well 2 reduces the available memory by about 60K. On a basic 128K QL the free memory shown was 27K, insufficient to run many programs; memory expansion would be essential for many years.

To format, the key "F" is pressed; instructions then appear on the screen. To exit from Cue-Well, the keying is Ctrl+Shift+Q; the routines are still available afterwards by typing C2 and Enter again.

When a directory is requested, the files are listed with alphabetic designations, 26 to a screen. The file sizes are shown alongside the names, with the disc/cartridge volume name and information on usage of sectors above the files listing. Pages of the Directory are selected by pressing 1 — first page or 2 — next page.

Files are sorted alphabetically, the maximum number on one medium which will be listed being 156. The Directory listing can be printed by pressing 3; this produces the basic data on medium and files, without any of the on-screen instructions. As is usual with simple printing routines, printing starts from the left edge of the paper; why is it that programmers never allow a margin for filing? Pressing the letter corresponding to a particular file is a SuperBasic program, EXEC PROGRAM if it is an executable program, or LOAD & CALL if it is a machine code or data file, and COPY, DELETE or RENAME.

At the bottom of the screen are further options — SHOW DESCRIPTION and ADD FILE DESCRIPTION. This is the novel feature of the package; selecting ADD allows you to type-in a description up to 96 characters long of the file already selected.

A window is opened for your description to be typed-in. The descriptions are accumulated in a file FILE_DESCRIPTS, which appears to be 17K in size regardless of how many file descriptions it contains and the lengths of the descriptions. This length will not normally present a problem with discs but it is a significant proportion of available space on a cartridge.

Selecting SHOW produces the description for the selected file; descriptions for any other files on the screen can then be displayed by pressing the key corresponding to the file, without having first to go back and select each file separately.

The COPY, DELETE and RENAME functions save some keying compared to the usual procedure from the SuperBasic command line; you press the letter for the file, then the one for the function, and a menu appears with 1-key choices of F1-F4 for the "to" device. To copy a file from flp1_ to mdv2_, with Cue-Well active, you press F3 — select Dir of flp1_; A, or whatever the file designator is; C — for Copy — and F2 — to mdv2_.

There seems to be no way of making a choice of function once the SHOW or ADD commands have been selected; to be able to Copy you have to return to the main menu and re-select the device and file. The DELETE function does not offer the "yes/no" safety feature but the FORMAT function chosen from the main menu does. The instructions warn that using the LOAD command on a data file — such as a Quill _doc — may crash the QL.

The re-design function on the main menu allows you to tailor Cue-Well to suit your mode of operation. You can alter the Directory devices, perhaps substituting ram1_ and ram2_ for mdv1_ and mdv2_ if you do not use the latter devices. The screen colours can be inverted, from green text on a black background to red text on a white background.

Re-design

Blank FILE_DESCRIPTS files can be placed on the medium in any of the four Directory devices; this is necessary before you can add file descriptions to the medium. The printer baud rate can be selected; the options are 75/300 / 600 / 1,200 / 2,400 / 4,800/ 9,600 / 19,200 baud. The new design can then be saved from the same menu.

Cue-Well can be loaded before a system boot and works with as obvious interference. Loading it from the copy, then LRUN-ing a boot file which contained LRESPR and RESPR commands for *Turbo*,

Lightning and *FlashBack*, and several ALTKEY designations, caused no hiccups. Loading the multi-tasking program *Q_Switch* and running two copies of *The Editor*, with Ice installed, showed all functions apparently working normally. *SpellBound* was run subsequently, using ALCHP in place of RESPR to load the code, with no difficulty. In other words, Cue-Well 2 is well-behaved and can be used in a multi-tasking environment. If you use the Toolkit command EXTRAS it will show the new Keyword C2 on the list.

The package is reasonable value and would be helpful to a user who has not yet invested a larger amount in one of the standard front-end programs. It is certainly cheaper than investing in an icon front-end with a mouse but the facilities offered are very basic, the main plus point being a reduction in the amount of keypresses required for commands. An experienced user would be able to circumvent the back-up errors but the novice would be well-advised to buy the cartridge version rather than the disc or enquire first if the errors have been fixed.

Information:
Firebirds
Price £14
Jochen Merz Software,
Im Stillen Winkel 12,
4100 Duisburg 11,
West Germany

Firebirds is very well presented. There is plenty of action to keep you on your toes — a good shoot-'em-down game. It loads with an attractive screen. When the game starts the graphics are smooth in movement and are a visual treat — there is sound. The colour facilities have been used well to get the best effect and even being destroyed is spectacular.

Firebirds is a game with a fast pace; it uses the cursor keys for movement and spacebar for fire. If you prefer joystick that is no problem, provided you have one to use on the QL, and I would imagine it is probably even better when played with a joystick.

It is a one screen-type arcade game. Many people would consider games of this type as old hat but this is something else. You could say that Firebirds is a little like *Galaxians* with alien creatures in the form of birds flying in swirling paths amid meteors and asteroids against a backclotch of stars.

You can shoot at them but they can retaliate with bombs and they are crackshots and fast at finding you. Trying to keep out of the way of all the bombs they send is rather akin to dodging in and out of raindrops and you need fast reactions and an itchy trigger finger to keep your ship in one piece, especially when the large solitary descending bomb explodes and bursts into pieces — because if one of those fragments hits your ship it is destroyed.

Kamikasi

What is more, when the aliens cannot get you in a hail of bombs they group and dive at you like demented kamikasi pilots in a death-or-glory bid to send you packing.

You can, by pressing the up cursor key, put up the shield and launch to get among them and clobber seven kinds of sunshine out of them. Your ship is then unaffected by anything the aliens can hurl at it, so you are not restricted to being a lone ship on the ground and moving left to right. You can do that only once with each of your ships, so it is best to use that option when you can do the most damage with it.

A friend who is very difficult to please, so far as leisure software goes, saw the game. With a shout of "Give me some of that," he pushed me out of my chair and zapped away for a long time and became absorbed in it.

The increasing quality of games software never ceases to amaze me, even on such computers as the Spectrum. Computer games have come a long way since the time *Space Invaders*, with its boring movement and *Manic Miner* with its breath of fresh air, first appeared on the scene.

Firebirds is a good indication that quality games software is available on the QL for those who want to use it. I would like to see more games from Jochen Merz Software, especially the platform type of game, if it can continue to produce the kind of quality I found in this game.

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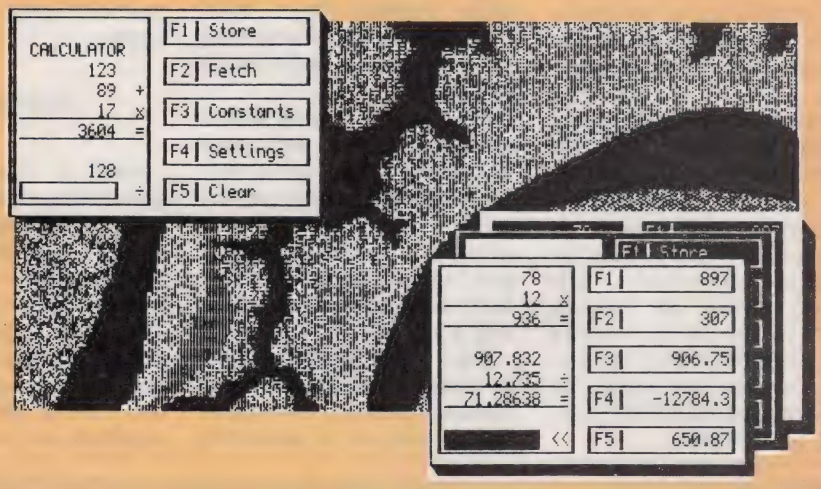
SUPER BASIC

Mike Lloyd begins a new project to develop a calculator program which uses the QL functions, instead of imitating a pocket machine.



All programmers have readily to hand a calculator. It must strike some of them as ironic that even though they have one of the most powerful calculating engines available they have to resort to its tiny hand-held cousin to perform simple arithmetic. On the other hand, I can remember reading some years ago an attack on the rash of calculator programs developed for the Spectrum and its rivals which ridiculed the attempts to make an expensive computer copy a cheap calculator. By developing a calculator program for the QL I can only defend myself by observing how times have changed.

What was wrong with the Spectrum calculator? It was based too closely on real calculators. It had a single input and output line, had only a single memory and worked only in decimal. It could not be put into a shopping bag or briefcase and, paradoxically, it could not be used when programming because the Spectrum could run only a single program at a time. It was much like adapting a car to act as a lawnmower — technically possible but scarcely worthwhile.

Other computers have since had calculators along much the same lines as the one for the Spectrum. The use of the office desk-top metaphor in WIMP environments such as GEM has encouraged a further step towards farce, the display line is now incorporated into a faithfully-produced but utterly-redundant graphic of a calculator keypad. The otherwise excellent Cambridge Z-88 is just one offender.

If the *QL-Calculator* is to be worthwhile it must take advantage of the strength of the computer to meet the needs of potential users. The weaknesses of most calculators are that they offer limited display facilities, little memory power and operate only in decimal. Being portable and general-purpose, they are also likely to be in someone else's possession in some distant location when they are most needed beside the computer.

The strengths of the QL are that it has a relatively huge display area of up to 2,125 characters, it has a prodigious memory, it can multi-task programs and it can be programmed to the user's exact requirements. Its lack of portability is converted to a strength because if the calculator program is tailored to a programmer's needs it will be the correct utility in the proper location all the time.

Problems

What makes the QL-Calculator such an interesting subject for a SuperBasic project is that it brings together a wide variety of programming problems in the form of an extremely useful utility. It comprises some 30 procedure and function definitions, although only two are of any great length, linked in a complex hierarchy which clearly demonstrates the advantages of structured programming. It involves two useful functions to convert to and from decimal into other bases. It has a layered menu system, a thoroughly reliable error-trapping mechanism and some interesting window management routines.

For the programming novice the QL-Calculator offers many lessons in programming technique. Other programmers will find that many of the program routines can be transplanted into programs of their own. The listings also include all the necessary entry points to develop additional features for the program and to incorporate QL-Calculator into a linked suite of programming utilities.

The program has been written to compile effortlessly, using the Digital Precision *Turbocharge* compiler. Readers without a compiler will still find the utility useful when re-numbered and appended to programs being developed. The full details, together with suitable listings, will be given at the end of the project.

For readers who dislike copying lengthy programs from magazines, an enhanced version of the published program will be offered in Microdrive Exchange in both SuperBasic and compiled form at a later date. Regular followers of SuperBasic are strongly advised to take the subscription offer to *Sinclair QL World* to follow QL-Calculator development beyond the February issue of the magazine, when it will no longer be sold in the high street.

Having emphasised earlier the futility of following the established design for an electronic calculator slavishly, the first step in producing a more practical variation on the theme was to analyse users' requirements and compare them to the abilities of the computer. The first step away from the well-trodden path of writing a calculator program was to reject the electronic calculator as a role model and to begin instead with its long-established predecessor, pencil and paper.

With pencil and paper, the figures in the computation are written in columns and appended with a mathematical operator. The total usually appears between ruled lines after all the values have been written, although sometimes a sub-total is obtained before further computation. If the result is unexpected, the column of amounts can be reviewed to check for any error. Frequently-used values may be recorded elsewhere on the paper for future reference.

Electronic calculators do not work like this. They display either the running total or the most recently-entered number. Some may display the current operator but most do not. If the result is unexpected the entire sum must be performed again to check its veracity. Most calculators can retain only one number in memory.

The QL-Calculator may share some features with electronic calculators, particularly in the method of displaying input and storing values, but its output is based firmly on the paper and pencil model, as the screen dump shows. The entered amounts and associated totals and sub-totals scroll up the window as if on a till roll until they disappear at the top. The program can also produce a printed copy of the sums for permanent reference.

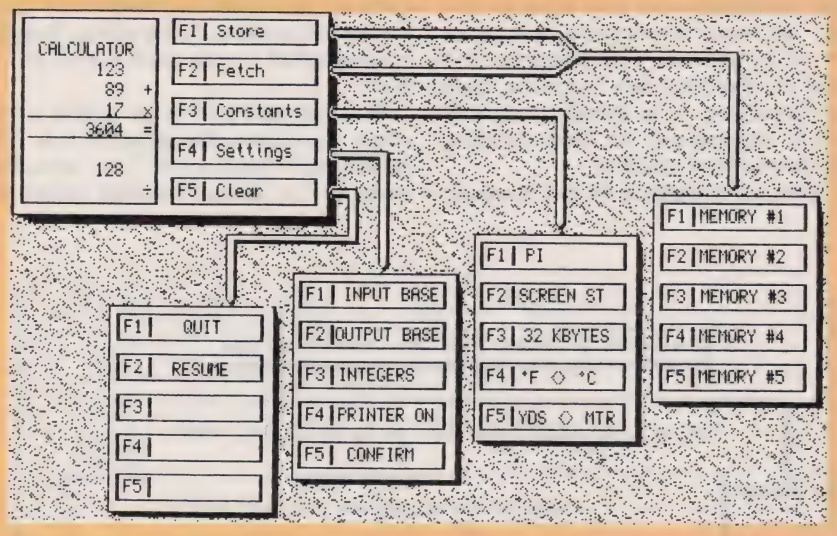
Having determined the shape of the main display area it was necessary to give thought to the menu. One option was to overlay a menu on the "till roll" area by pressing the F3 key, thus reducing the amount of screen area required by the program. This adds a keypress to each menu choice and creates the problem of reproducing the figures obliterated by the menu, so it was rejected.

Options

The pros and cons of various menu systems have been rehearsed thoroughly in previous articles. The QL-Calculator required a relatively simple and unextensive menu, for which the five QL function keys seemed ideal. Associating a menu choice with each of the QL function keys restricts the program to five main options but each main menu option can call up another menu of five options. A further level of menu might just be feasible before the structure becomes too unwieldly.

The decision to base the menu on the function keys influenced the height of the calculator window, the design of the display, the number of memories offered and the total number of options available. Only 20 of the 25 possible menu options are at present used, the fifth function key is identical in operation to the ESC key and could be used to access a different submenu if required. Figure two shows the menu system in diagrammatic form.

The QL accepts numerical input only in decimal but many values used in computing are better expressed in binary — base 2 — hexidecimal — base 16 — or even octal — base B. As well as being able to work in any of those bases it is also useful to translate between one base and another as a calculation proceeds. The QL-Calculator is particularly good at converting values between bases; the input and output bases are easily selected using the "SETTINGS" sub-menu. The only restriction is that converted numbers must be positive integers.



This is not a problem for computer programmers but might restrict scientists or mathematicians working with binary fractions or negative values. They might feel inspired to re-write the program conversion functions described. SuperBasic prides itself on including general-purpose routines which can be used without alteration in other programs. The conversion routines used in QL-Calculator, however, have had to be modified extensively to suit the particular circumstances of the program.

For the benefit of code stealers, listings of the generic versions of the routines accompany this article.

It is possible to write a single function

LISTING 1

```
100 DEFine FuNction From_Decimal$ (Number, Base)
105 LOCal Temp, Digit$, Result$
110 LOCal Exponent, Value
115 Digit$ = "0123456789ABCDEFGHIJKLMN"
120 Temp = Number: Result$ = ""
125 FOR Exponent = INT (LN (Number) / LN (Base))
    TO 0 STEP -1
130   Value = INT (Temp / Base ^ Exponent)
135   Result$ = Result$ & Digit$ (Value + 1)
140   Temp = Temp - Value * Base ^ Exponent
145 END FOR Exponent
150 RETurn Result$
155 END DEFine From_Decimal$
```

LISTING 2

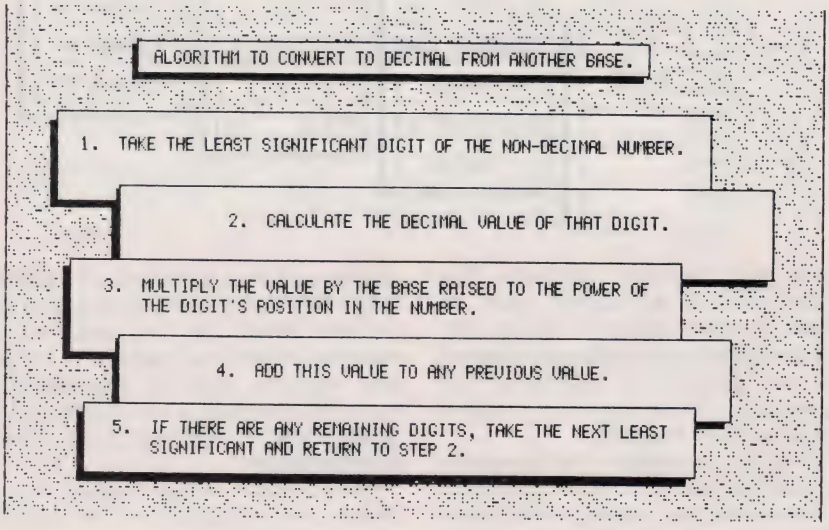
```
200 DEFine FuNction To_Decimal (Number$, Base)
205 LOCal Result, CharPos, Value, Digit$
210 Digit$ = "0123456789ABCDEFGHIJKLMN"
215 Result = 0
220 FOR CharPos = 0 TO LEN (Number$) -1
225   Value = Number$ (LEN (Number$) - CharPos)
      INSTR Digit$ -1
230   Result = Result + Value * (Base ^ CharPos)
235 END FOR CharPos
240 RETurn Result
245 END DEFine To_Decimal
```

LISTING 3

```
300 REMark    EXAMPLE CALLS
305   :
310   PRINT "255 in hex = ";
315         PRINT From_Decimal$ (255, 16)
320   :
325   PRINT "100 in binary = ";
330         PRINT From_Decimal$ (100, 2)
335   :
340   PRINT "FFF (hex) in decimal = ";
345         PRINT To_Decimal ("FFF", 16)
350   :
355   PRINT "307 (octal) in decimal = ";
360         PRINT To_Decimal ("307", 8)
365   :
370 STOP
```

which translates from any base to any other but most conversions are either from or to decimal. For simplicity and speed of operation two functions have been produced, one handling conversions to decimal and the other handling conversions from decimal.

It is accepted practice for the numerals of other bases to be represented by the normal digits, supplemented by capital letters where the base has more than 10 digits. Binary, for instance, uses only the digits 1 and 0, while hexidecimal uses all the decimal digits plus the letters A to F representing the decimal values of 10 to 15. This convention dictates that all non-decimal values must be held as strings. With the powerful QL coercion facility decimal values could be represented equally easily as numbers or strings. In QL-Calculator code the circumstances dictated decimal strings but in the versions here the decimal input and output are numeric.



New base

Listing one tackles the problem of converting a decimal value into another base. The concept of conversions is simple, even though the listing looks complicated. The pseudo-code for a typical conversion between decimal and hexidecimal is shown in figure two. All internal variables are declared to be LOCal to the definition. A string of digits is defined which begin with the normal 0-9 and then progresses to the letters of the alphabet. The string shown will handle values represented in any integer base between 2 and 24.

To emphasise the mechanics of the conversions no error-trapping statements have been included.

Because the decimal number will be manipulated during the course of the function its value is transferred to a temporary variable. A null string, *Results*, is established to take each output digit in turn.

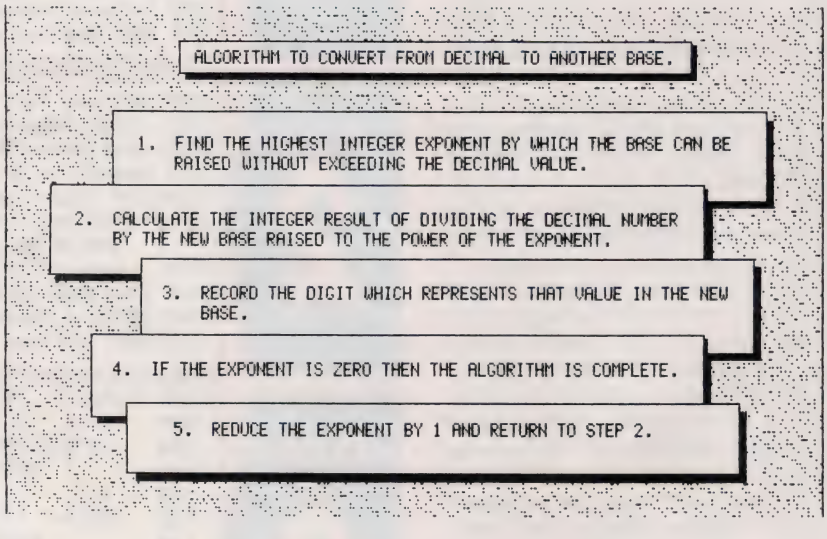
The main body of the function is a loop which translates the pseudo-code into SuperBasic statements. The unfamiliar keyword LN is the "natural logarithm" which uses base "e". The mathematical symbol "e" represents an irrational constant 2.71828 and should not be confused with the SuperBasic scientific notation "E" for exponents in large or small numbers, such as 9.45E7. This is not the time to delve too deeply into pure mathematics. Suffice it to say that the expression in the FOR..NEXT loop provides the correct values for Step 1 of the algorithm for any base. If the conversion of 65535 (decimal) to hexadecimal was being attempted the computer would reduce the line to:

FOR Exponent = 4 to 1 STEP −1

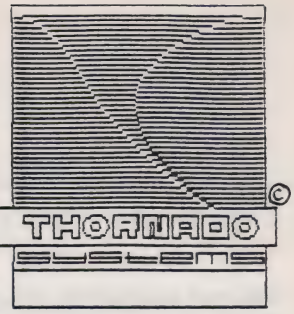
This establishes precisely how many digits there will be in the result string and works for any valid base and any size of positive whole number. The value of each digit in turn is calculated in line 130 and used to add a character from the Digit$ string to the Result$ string. Before the loop cycles the value of *Temp* is reduced by the amount represented by the new character in Result$. When the iteration is completed the Result$ string is returned to where the function was called.

To reverse the process, listing two uses the same Digit$ string and initialises a result variable. The characters in the Number$ string passed to the function definition are considered in turn, beginning at the lowest. The decimal value which a character represents is discovered by referring to its position in the Digit$ string. This is then multiplied by the appropriately-exponented base value. This final value is added to the Result variable which, on completion of the loop, is returned to where the function was called. The pseudo-code for this process is represented at figure three.

Non-mathematicians can treat the functions as black boxes and use the listings without understanding how they work. A good way to check the accuracy of the functions is to convert from base 10 to base 10 and vice versa. If the input and output are identical the functions would appear to be working correctly. Listing three offers some other simple values to test the functions.



Next month's article establishes the arena for further arithmetical combat by defining the screen display and the variables used by the QL-Calculator program.



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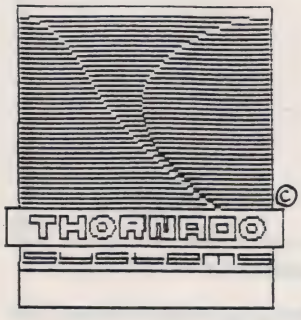

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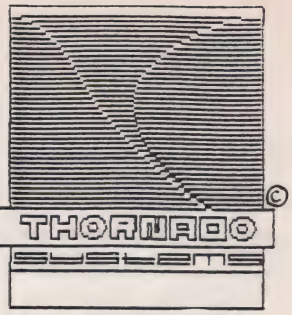

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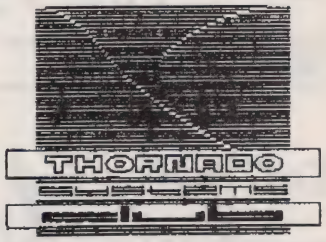

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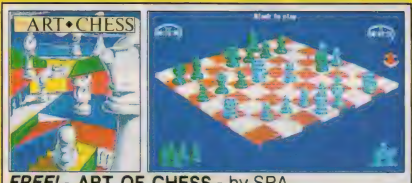

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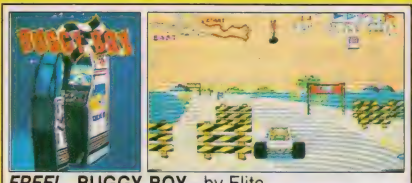

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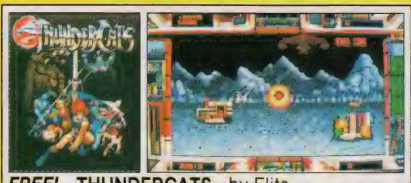

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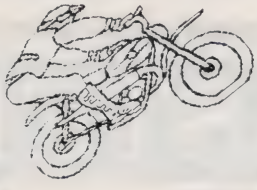

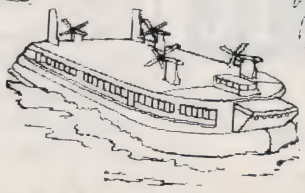

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Program of the month

MULTIPLICATION TABLES

by Ron Allpress

This month's program is ideal either for teaching the younger generation to know its multiplication tables by heart — a useful skill even in these days of computers and calculators — or for polishing your own skills so that your offspring do not put you to shame.

Leslie Fahidy's *Multiplication Quiz* in the September, 1986 *QL World* provided a useful base from which to develop this suite of multiplication table routines to help my son memorise his tables. In its finalised form the program is highly flexible, being able to cover the full range from the first understanding of a new table to being able to do a quiz on all 12 tables.

Five levels

The program is sufficiently well-structured and internally-documented to need little further explanation. It self-loads after pressing F2 and Capslock, giving a menu of the five levels — Learn, Recite, Practise, Test and Quiz. A choice of table is given for each.

Learn_table aims to give a child an understanding of what is meant by multiplication by means of a simple graphical approach. It may be speeded by pressing the spacebar. It is assumed that a call of Learn_table will be only the the chosen table and there will thus be an automatic progression to a session of Recite_tables. Return to the menu to learn other tables.

It is recommended that when Recite_tables is called the child be encouraged at least to mouth each line. The pace of Recite_tables may be ajusted by changing line 1260 or, alternatively, by speeding the printing of each line by pressing the spacebar.

A call of Practise_tables gives an in-order completion test. An incorrect answer leads to a teaching session as in Learn_tables and the correct response is highlighted. After one or more incorrect answers the child is prompted to learn the highlighted lines and is then obliged to repeat practising that table before being allowed to move to another table or level.

No prompt

In Test_tables, 10 jumbled single-line completion-type questions are set. The child no longer has the other lines of the table as a prompt, as was available in Practice_tables. Incorrect responses lead to a teaching session. Tests are timed and a child should be encouraged to repeat the test until a respectable time of around 60 seconds is achieved. It is remarkable how quickly the times are reduced to this level and how reluctant a child is to take any satisfaction from sessions in which one or more responses were incorrect.

Quiz

Quiz_tables is similar to Test_tables except that the child will usually be tested on more than one table at a time. At each call of Test_tables the table used is recorded in a list and at the next call of Quiz_tables there is an option of either accepting or altering this list.

When Quiz_tables is called before any calls to Test_tables

have been made, the default of all tables is given with the same option of accepting or altering the list. As there may be several tables in the list, Quiz_tables can test only some elements in any cycle. To ensure adequate coverage the program sets up a loop giving as many rounds as there are tables in the list. Simple changes to lines 2750 and 2760 would reduce the number of rounds per visit. Feedback is given on performance after each round and session.

Black belt

To be able to call Quiz_tables on all 12 tables and obtain 10 out of 10 repeatedly with respectable times is the black belt of junior level arithmetic and proof that the program has done its work.

After completion of each menu choice of Recite, Practise or Test there will be an option to choose one of four follow-up actions. The child may elect to repeat the last table, change to a new table at the same level, move to the next level with the last table, or call the main menu. As the normal route to Quiz_tables is through Test_tables a quiz session is followed only by the options to repeat the quiz using the chosen list of tables, or to call the menu.

Those who do not need to use this program would accept without question that 2×3 has the same value as 3×2. This familiar property, called the commutative property of the operation of multiplication of numbers, should not be assumed to be known or understood by a young child. It will be readily accepted, given sufficient early-learning experience with objects and familiarity with its use will be reinforced by a casual reference to the graphical display in the Learn_table option.

Interesting

When a child has accepted this interesting mathematical property of numbers, parents or teachers should encourage its use without, of course, calling it by its proper name. This property halves the number of multiplication bonds which have to be memorised and will help the child learn quick-arithmetic techniques when they are met at the secondary school level.

Simple

To cover the possibility of more than one child using the program at the Test_tables level in a single session there will be an option which will clear the list of tables tested from the computer memory.

The program contains comprehensive yet simple error-trapping and it should be possible to leave a child unsupervised, as only the pressing of ‹RESET› or a ‹CTRL-SPACE›-break will interrupt the session. It is ideal for home and school use, for which it justifies the purchase of a cheap dedicated QL. It has been left on the author's QL for many hours waiting for a suitable commercial break or the inducement of a small reward, or bribe, for achieving a specified time. The drill required to achieve mastery makes the learning of multiplication tables tedious. It is unlikely to be a particularly enjoyable experience, however it is dressed up, though many children obtain satisfaction from doing well on the tables tests at school. The author has little time for the attractive yet distracting frills of trains moving across the screen but is not averse to giving a small reward for a little application.

Dedication

One youngster was remarkably content to learn and practise his tables using the program and is richer for the experience — in more ways than one. This program is dedicated to Mark who was very patient, despite a few tears of frustration when the keyboard let him down — or so he claimed — and the computer blew him a raspberry. I never could understand, however, why he took exception to the recorded time being -3471 seconds.

```
100 REMark ********************************************
110 REMark ***   MULTIPLICATION TABLES SUITE    ***
120 REMark ***  © RON ALLPRESS OCTOBER 1987     ***
130 REMark ***  CONTAINS PARTS OF L. FAHIDY'S   ***
140 REMark ***      PROGRAM OF SEPT 1986        ***
150 REMark ***   WRITTEN AND TESTED ON AN UN-   ***
160 REMark ***      EXTENDED JM VERSION QL      ***
170 REMark ***      PROGRAM IS REASONABLY       ***
180 REMark ***    CHILD-PROOF WHEN RUNNING!     ***
190 REMark ********************************************
200 :
210 :
220 :
230 intro "Multiplication Tables"
240 REMark *** Gives screen title:See line 590 ***
250 LET test=0:DIM tables_list(12)
260 REPeat do_tables
270 menu
280 REMark *** Gives screen menu :See line 680 ***
290 IF menu_choice$ INSTR "LRPT" THEN
300 which_table
310 REMark *** which_table :See line 890  ***
320 ELSE
330 quiz_tables test,tables_list
340 REMark ***  quiz_tables :See line 2540  ***
350 END IF
360 IF menu_choice$ INSTR "T" THEN
370 tables_list(table_choice)=table_choice
380 test_tables(table_choice)
390 REMark ***  test_tables :See line 2010  ***
400 END IF
410 IF menu_choice$ INSTR "P" THEN
420 practise_tables(table_choice)
430 REMark ***  practise_tables :See line 1410 ***
440 END IF
450 IF menu_choice$ INSTR "R" THEN
460 recite_tables(table_choice)
470 REMark ***  recite_tables :See line 1170  ***
480 END IF
490 IF menu_choice$ INSTR "L" THEN
500  learn_table(table_choice)
510 REMark ***  learn_table :See line 1060  ***
520 END IF
530 END REPeat do_tables
540 :
550 :
560 :
570 :
580 :
590 REMark ***  SCREEN INTRO  ***
600 DEFine PROCedure intro (title$)
610 MODE 8:CSIZE 1,1:PAPER 2:INK 7:CLS
620 AT 5,(26-LEN(title$))/2:PRINT title$:PAUSE 90
630 CSIZE 0,0:PAPER 1:INK 6:CLS
640 END DEFine intro
650 :
660 :
670 :
680 REMark ***  SCREEN MENU  ***
690 DEFine PROCedure menu
700 PAPER 6:INK 1:CLS
710 AT 3,1:PRINT"Press the letter for your choice"
720 AT 6,1:PRINT "To learn a table:-  ";TO 27;
"Press L"
730 AT 8,1:PRINT "To recite a table:-  ";TO 27;
"Press R"
740 AT 10,1:PRINT"To practise a table:-  ";TO 27;
"Press P"
750 AT 12,1:PRINT"For a test on a table:-  ";TO
27; "Press T"
760 AT 14,1:PRINT"For a tables quiz:-  ";TO 27;
"Press Q"
770 REPeat menu_choice
780  AT 16,27:INPUT "Which?";menu_choice$
790 IF menu_choice$<>"" AND menu_choice$ INSTR
"LRPTQ" THEN
800 EXIT menu_choice
810 ELSE
820 rub_out menu_choice$,16,33:REMark ***  See
line 4120  ***
830 END IF
840 END REPeat menu_choice
850 END DEFine menu
860 :
870 :
880 :
890 REMark ***  WHICH TABLE?  ***
900 DEFine PROCedure which_table
910 CLS
920 AT 10,4:PRINT"Which table <1,....,12>?"
930  REPeat pick table
```

```
940 AT 14,27:INPUT table_choice$
950 IF table_choice$<"1" OR table_choice$>"12"
THEN
960 rub_out table_choice$,14,27
970 ELSE
980 LET table_choice=table_choice$
990 EXIT pick_table
1000 END IF
1010 END REPeat pick_table
1020 END DEFine which_table
1030 :
1040 :
1050 :
1060 REMark ***  LEARN TABLE  ***
1070 DEFine PROCedure learn_table(table_choice)
1080 intro "Learn a Table"
1090 FOR learn=1 TO 12
1100   teach table_choice,learn:wait:CLS:REMark
***  See line 3550  ***
1110 END FOR learn
1120 recite_tables(table_choice)
1130 END DEFine learn_table
1140 :
1150 :
1160 :
1170 REMark ***  RECITE TABLE  ***
1180 DEFine PROCedure recite_tables(table_choice)
1190 intro "Recite a Table"
1200 REMark ***  M is the multiplicand  ***
1210 REPeat table_recite
1220 CLS
1230 FOR M = 1 TO 12
1240 AT M,11:PRINT table_choice:AT M,15:PRINT "x
";M
1250 AT M,21:PRINT "=  ":AT M,24: PRINT
table_choice*M
1260   PAUSE 175
1270 END FOR M
1280 option "Recite","Practise"
1290 REMark ***  Change table,Repeat,Practise or
Menu? :See line 4530  ***
1300 IF option$ INSTR "CMP" THEN EXIT table_recite
1310 END REPeat table_recite
1320 IF option$ INSTR "P" THEN
practise_tables(table_choice)
1330 IF option$ INSTR "C" THEN
1340 which_table
1350 recite_tables(table_choice)
1360 END IF
1370 END DEFine recite_tables
1380 :
1390 :
1400 :
1410 REMark ***  PRACTISE TABLES  ***
1420 DEFine PROCedure
practise_tables(table_choice)
1430 intro "Practise a Table"
1440 REPeat table_practise
1450 DIM high_light(12):LET mistakes=0:CLS
1460 REMark ***  M is the multiplicand  ***
1470 FOR M = 1 TO 12
1480  AT M,11:PRINT table_choice:AT M,15:PRINT "x
";M
1490  AT M,21:PRINT "=  ":LET answer$="?"
1500 check_input answer$,M,24:REMark ***  See line
4200  ***
1510   IF answer$=table_choice*M THEN
1520   good_news
1530   REMark ***  Happy trill :See line 3640  ***
1540 END IF
1550   IF answer$<>table_choice*M THEN
1560     LET high_light(M)=1:LET mistakes=
mistakes+1
1570      bad_news
1580      REMark ***  Rasperry!:See line 3370  ***
1590     teach table_choice,M
1600      REMark ***  Help cometh!:See line 3730
***
1610     wait
1620      REMark ***  Are you awake? :See line
4180  ***
1630    Rebuild_table(table_choice),M
1640    REMark ***  Rebuilds table to last mistake
with high-lighting  ***
1650    REMark ***  See line 1870  ***
1660   END IF
1670 END FOR M
1680 IF mistakes = 0 THEN
1690 option "Practise","Test"
1700 REMark ***  Change table,Repeat,Test or Menu?
***
1710 IF option$ INSTR "CMT" THEN
1720 EXIT table_practise
1730 ELSE
1740 AT 16,9:PRINT"Practise those in red
1750 AT 17,9:PRINT"then press any key.":wait
1760 END IF
1770 END REPeat table_practise
1780 IF option$ INSTR "T" THEN
test_tables(table_choice)
1790 IF option$ INSTR "C" THEN
1800 which_table
1810 practise_tables(table_choice)
1820 END IF
1830 END DEFine practise_tables
1840 :
1850 :
1860 :
1870 REMark ***  REBUILDS TABLE  ***
1880 DEFine PROCedure
Rebuild_table(table_choice,M)
1890 CLS:CSIZE 0,0
1900 REMark ***  M is the multiplicand  ***
1910 FOR row = 1 TO M
1920 IF high_light(row)=1 THEN STRIP 2
1930   AT row,11:PRINT table_choice;"   ":AT
row,15:PRINT "x  ";row
1940   AT row,21:PRINT"=":AT row,24:PRINT
table_choice*row
1950 STRIP 1
1960 END FOR row
1970 END DEFine Rebuild_table
1980 :
1990 :
2000 :
2010 REMark ***  TEST A TABLE  ***
2020 DEFine PROCedure test_tables(table_choice)
2030 LOCal a$,time_now$,end_time$
2040 LET test=1
2050 intro "Test a Table"
2060 PAPER 6:INK 0
2070 REPeat table_test
2080 DIM number(10)
2090 a$=DATE$:time_now$=a$(16 TO 20)
2100 correct_marker = 0
2110 LET number_1=table_choice
2120 LET tables_list(number_1)=table_choice
2130 FOR counter = 1 TO 10
2140 CSIZE 3,1
2150 CLS
2160 REPeat multiplier
2170 LET mark=0
2180 LET number_2=RND(1 TO 12)
2190 FOR check=1 TO counter
2200   IF number_2=number(check) THEN mark=1:EXIT
check
2210 END FOR check
2220 IF mark=0 THEN EXIT multiplier
2230 END REPeat multiplier
2240 LET number(check)= number_2
2250 AT 5,6: PRINT number_1:AT 5,10:PRINT "x  ";
number_2
2260 AT 5,16:PRINT "=  ":LET answer$="?"
2270 check_input answer$,5,19
2280 IF answer$=number_1*number_2 THEN
2290  correct_marker= correct_marker + 1:
good_news: correct:REMark***See lines 3640,3390***
2300 ELSE
2310  bad_news: wrong:teach number_1,number_2:
wait:REMark***See lines 3550,3470,3730,4180***
2320 END IF
2330 END FOR counter
2340 CSIZE 0,0
2350 CLS
2360 a$=DATE$:end_time$=a$(16 TO 20)
2370 minutes=end_time$(1 TO  2)- time_now$(1 TO 2)
2380 time_elapsed=60*(end_time$(1 TO 2)-
time_now$(1 TO 2))+end_time$(4 TO 5)-
time_now$(4 TO 5)
2390 faces(correct_marker):REMark ***  See line
3170  ***
2400 AT 12,10:PRINT "You took "! time_elapsed!"
seconds."!
2410 option "Test","Quiz"
2420 REMark ***  Change Table,Repeat,Quiz or Menu?
***
2430 IF option$ INSTR "CMQ" THEN EXIT table_test
2440 END REPeat table_test
```

```
2450 IF option$ INSTR "C" THEN
2460 which_table
2470 test_tables(table_choice)
2480 END IF
2490 IF option$ INSTR "Q" THEN quiz_tables
test,tables_list
2500 END DEFine test_tables
2510 :
2520 :
2530 :
2540 REMark ***  QUIZ ON TABLES  ***
2550 DEFine PROCedure
quiz_tables(test,tables_list)
2560 LOCal a$,time_now$,correct_marker, mark,table
2570 intro "Tables Quiz"
2580 PAPER 6:INK 0
2590 DIM new_tables_list(12),tab(12)
2600 FOR table=1 TO 10
2610 tab(table)=2*table+1
2620 END FOR table
2630 FOR table=11 TO 12
2640 tab(table)=3*table-9
2650 END FOR table
2660 quiz_list test,tables_list,new_tables_list
2670 REMark ***  Accept or Change list of tables
for Quiz: See line 4780  ***
2680 LET new_tables_list(0)=0:correct_total=0:
total_time=0
2690 FOR table = 1 TO 12
2700 IF new_tables_list(table)<>0 THEN
2710 LET new_tables_list(0)=new_tables_list(0)+1
2720 END IF
2730 END FOR table
2740 REPeat quiz
2750 intro "There will be "&new_tables_list(0)&"
rounds"
2760 FOR  round =1 TO new_tables_list(0)
2770 intro "Round "&round
2780 PAPER 6:INK 0:CSIZE 3,1
2790 DIM n3(10),n4(10)
2800 a$=DATE$:time_now$=a$(16 TO 20)
2810 correct_marker=0
2820 FOR counter=1 TO 10
2830 CLS:CSIZE 3,1
2840 REPeat multiplicand
2850 number_3=RND(1 TO 12)
2860 IF new_tables_list(number_3)<>0 THEN
2870 mark=0
2880 IF new_tables_list(0)>=10 THEN
2890 FOR check=1 TO counter
2900   IF number_3=n3(check) THEN mark=1:EXIT
check
2910 END FOR check
2920 END IF
2930 IF mark=0 THEN EXIT multiplicand
2940 END IF
2950 END REPeat multiplicand
2960 LET n3(counter)=number_3
2970 REPeat multiplier
2980 mark=0
2990 number_4=RND(1 TO 12)
3000 FOR check=1 TO counter
3010 IF number_4=n4(check) THEN mark=1:EXIT check
3020 END FOR check
3030 IF mark=0 THEN EXIT multiplier
3040 END REPeat multiplier
3050 LET n4(counter)=number_4
3060 AT 5,6:PRINT number_3:AT 5,10:PRINT"x  ";
number_4
3070 AT 5,16:PRINT "=  ":LET answer$="?"
3080 check_input answer$,5,19
3090 IF answer$=number_3*number_4 THEN
3100  correct_marker= correct_marker + 1:
good_news: correct
3110 ELSE
3120 bad_news:wrong
3130 teach number_3,number_4:wait
3140 END IF
3150 END FOR counter
3160 CLS:CSIZE 0,0
3170 a$=DATE$:end_time$=a$(16 TO 20)
3180 minutes=end_time$(1 TO 2)-time_now$(1 TO 2)
3190 time_elapsed=60*(end_time$(1 TO 2)-
time_now$(1 TO 2))+end_time$(4 TO 5)-
time_now$(4 TO 5)
3200 faces(correct_marker)
3210 AT 12,10:PRINT"You took "!time_elapsed!"
seconds."
3220 PAUSE 150
3230 LET correct_total=correct_total+
correct_marker
3240 LET total_time=total_time+time_elapsed
3250 CLS
3260 END FOR round
3270 CLS
3280 AT 5,4:PRINT "You got ";correct_total; " out
of ";round*10;" correct"
3290 AT 7,5:PRINT "You took "!total_time!"
seconds."
3300 PAUSE 150
3310 option "Quiz"," "
3320 REMark ***  Repeat or Menu  ***
3330 IF option$ INSTR "M" THEN EXIT quiz
3340 END REPeat quiz
3350 END DEFine quiz_tables
3360 :
3370 :
3380 :
3390 REMark ***  MESSAGE WHEN CORRECT  ***
3400 DEFine PROCedure correct
3410 AT 6,9: INK 2:FLASH 1:PRINT "Well done!"
3420 PAUSE 100: FLASH 0: INK 0
3430 END DEFine correct
3440 :
3450 :
3460 :
3470 REMark ***  MESSAGE WHEN WRONG  ***
3480 DEFine PROCedure wrong
3490 AT 6,5:INK 2:FLASH 1:PRINT  "No. Wait for
help!"
3500 PAUSE 100 :FLASH 0:INK 0
3510 END DEFine wrong
3520 :
3530 :
3540 :
3550 REMark ***  SOUND WHEN WRONG  ***
3560 DEFine PROCedure bad_news
3570 FOR j= 1 TO 255
3580 BEEP 500,j
3590 END FOR j
3600 END DEFine bad_news
3610 :
3620 :
3630 :
3640 REMark ***  SOUND WHEN CORRECT  ***
3650 DEFine PROCedure good_news
3660 FOR j= 100 TO 4000 STEP 500
3670  BEEP 5000,j: PAUSE 5
3680 END FOR j
3690 END DEFine good_news
3700 :
3710 :
3720 :
3730 REMark ***  TEACH  ***
3740 DEFine PROCedure teach(n1,n2)
3750 CLS:CSIZE 0,0
3760 AT 1,1:PRINT"To work out "!n1!  " x"!n2!":":
PRINT
3770 FOR j=1 TO n1
3780   FOR k=1 TO n2
3790  PRINT "*";
3800   END FOR k:PRINT
3810   END FOR j
3820 AT 5,17:PRINT "There are ";n1:AT 6,17::PRINT
"lots of ";n2;"'s"
3830 AT 7,17:PRINT "If you count all"
3840 AT 8,17:PRINT "the stars, you":AT 9,17:PRINT
"will find that"
3850 AT 10,17:PRINT "there are ";n1*n2:AT 11,17:
PRINT "of them."
3860 AT 12,17:FLASH 1:PRINT "So: "
3870 AT 14,17:UNDER 1:CSIZE 2,1:PRINT n1 ;" x ";
n2;" = ";n1*n2
3880 FLASH 0: UNDER 0: CSIZE 0,0
3890 AT 17,17: PRINT "Press any key."
3900 CSIZE 0,0
3910 END DEFine teach
3920 :
3930 :
3940 :
3950 REMark ***  DRAW FACES  ***
3960 DEFine PROCedure faces(count)
3970 CLS
3980 AT 1,1: PRINT "You got ";count;" of them
right,"
3990 increment=0:radius=7
4000 FOR n=1 TO count
4010   CIRCLE n*radius+1+increment,80,radius
```

```
4020  ARC n*radius+1+increment - 2.6, 78 TO
n*radius+1+increment+2.6 ,78,PI
4030   POINT n*radius +1+increment - 2, 82:POINT
n*radius+1+increment+2,82
4040   increment=increment+radius+2
4050 END FOR n
4060 AT 7,1:PRINT "and ";10 -count;" of them
wrong."
4070 increment=0
4080 FOR n=1 TO 10-count
4090   CIRCLE n*radius+1+increment,50 , radius
4100   ARC n*radius+1+increment- 2.6, 46 TO
n*radius+1+increment+2.6,46,-PI
4110   POINT n*radius+1+increment-2,52:POINT
n*radius+1+increment+2,52
4120   increment=increment+1+radius+2
4130 END FOR n
4140 END DEFine faces
4150 :
4160 :
4170 :
4180 REMark ***  WAIT FOR INPUT  ***
4190 DEFine PROCedure wait
4200 LOCal a$
4210 a$=""
4220 REPeat loop
4230   a$=INKEY$
4240   IF a$<>"" THEN EXIT loop
4250 END REPeat loop
4260 END DEFine wait
4270 :
4280 :
4290 :
4300 REMark ***  RUB OUT  INCORRECT INPUT  ***
4310 DEFine PROCedure
rub_out(text$,text_line,column)
4320 LET length = LEN(text$)
4330 AT text_line,column:PRINT FILL$(" ",length)
4340 END DEFine rubout
4350 :
4360 :
4370 :
4380 REMark *** REJECT SILLY ANSWERS  ***
4390 DEFine PROCedure
check_input(answer$,text_line,column)
4400 REPeat get_input
4410 AT text_line,column:INPUT answer$
4420 IF answer$="" OR answer$=" " THEN GO TO 4410
4430 IF answer$<="0" OR answer$>"999" THEN
4440 rub_out answer$,text_line,column
4450 ELSE
4460 EXIT get_input
4470 END IF
4480 END REPeat get_input
4490 END DEFine check_input
4500 :
4510 :
4520 :
4530 REMark ***  OPTION WHAT NOW?  ***
4540 DEFine PROCedure option(level$,change$)
4550 PAUSE 125:CSIZE 0,0
4560 IF level$(1) INSTR "RPT" THEN AT 14,4: PRINT
"Press C to Change table"
4570 AT 15,4:PRINT "Press R to Repeat"
4580 AT 16,4:PRINT "Press M to obtain Menu"
4590 IF change$<>" " THEN
4600 AT 17,4:PRINT "Press ";change$(1);" to move
on to a ";change$
4610 END IF
4620 REPeat choose_option
4630 AT 18,4: INPUT "Which?"; option$
4640 IF option$<>"" AND LEN(option$)=1  THEN
4650 IF (change$=" " AND option$ INSTR "RM") OR
(level$(1) INSTR "RPT" AND option$ INSTR
"RCM"&change$(1)) THEN
4660  EXIT choose_option
4670 ELSE
4680 rub_out option$,18,10
4690 END IF
4700 ELSE
4710 IF option$<>"" THEN rub_out option$,18,10
4720 END IF
4730 END REPeat choose_option
4740 END DEFine option
4750 :
4760 :
4770 :
4780 REMark ***  LIST TABLES FOR QUIZ  ***
4790 DEFine PROCedure
quiz_list(test,tables_list,new_tables_list)
4800 AT 6,2:PRINT "The quiz will be on the
following "
4810 AT 7,2:PRINT "multiplication tables:-  "
4820 AT 9,5:PRINT;
4830 FOR table=1 TO 12
4840 IF test=0 THEN
4850 PRINT " ";table;
4860 ELSE
4870 IF tables_list(table)<>0 THEN PRINT " ";
table;
4880 END IF
4890 END FOR table
4900 PRINT " "
4910 AT 12,5:PRINT "Press A to Accept this list."
4920 AT 14,5:PRINT "Press C to Change this list."
4930 REPeat quiz_on
4940 AT 16,5:INPUT "Which?";quiz_on$
4950 IF quiz_on$<>" " AND LEN(quiz_on$)=1 THEN
4960 IF quiz_on$ INSTR "AC" THEN
4970 EXIT quiz_on
4980 ELSE
4990 STRIP 1:rub_out quiz_on$,16,11:STRIP 6
5000 END IF
5010 ELSE
5020 IF quiz_on$<>"" THEN STRIP 1:rub_out
quiz_on$,16,11:STRIP 6
5030 END IF
5040 END REPeat quiz_on
5050  IF quiz_on$ INSTR "C" THEN
5060 alter_list
test,tables_list,new_tables_list:RETurn :REMark
***  See line 5170  ***
5070 ELSE
5080 FOR table=1 TO 12
5090  IF test=1 THEN LET new_tables_list(table)=
tables_list(table)
5100 IF test=0 THEN  LET new_tables_list(table)=
table
5110 END FOR table
5120 END IF
5130 END DEFine quiz_list
5140 :
5150 :
5160 :
5170 REMark *** ALTER LIST OF TABLES FOR QUIZ  ***
5180 DEFine PROCedure
alter_list(test,tables_list,new_tables_list)
5190 LOCal pick_table
5200 PAPER 1:CLS:STRIP 7:INK 0
5210 AT 8,2:PRINT "← or → to choose,<SPACE> to
select"
5220 AT 9,10:PRINT "<CTRL>← to delete"
5230 AT 10,2:PRINT "<ENTER> when your list is
complete"
5240 AT 15,3:PRINT "Multiplication tables chosen:-
"
5250 CSIZE 1,0
5260 n=1
5270 REPeat quiz_on
5280 FOR table=1 TO 12
5290 STRIP 7
5300 IF table=n THEN STRIP 2
5310 AT 13,tab(table)-2:PRINT table;
5320 END FOR table
5330 a$=INKEY$(-1)
5340 IF a$=CHR$(192) THEN n=n-1:IF n=0 THEN n=1
5350 IF a$=CHR$(200) THEN n=n+1:IF n=13 THEN n=12
5360 IF a$=CHR$(32) THEN
5370 LET new_tables_list(n)=n
5380 AT 17,tab(n)-2:STRIP 2:PRINT n
5390 END IF
5400 IF a$=CHR$(194) THEN
5410 LET new_tables_list(n)=0
5420 AT 17,tab(n)-2:STRIP 1:PRINT "  "
5430 END IF
5440 IF a$=CHR$(10) THEN
5450 REMark ***  Check for no choice  ***
5460 LET pick_table=0
5470 FOR check=1 TO 12
5480 LET pick_table= pick_table+
new_tables_list(check)
5490 END FOR check
5500 IF pick_table<>0 THEN CLS:PAPER 6:INK 0:EXIT
quiz_on
5510 END IF
5520 END REPeat quiz_on
5530 END DEFine alter_list
```

MICRODRIVE

KEY

B = Superbasic; A+O = assembler and object code; M+B = machine code and Basic loader; A+B+O = assembler and Basic loader and object code; S = supercharged; L = QLiberated; f1 = monitor mode; f2 = TV mode

1. DIY ASSEMBLER by Giles Todd (B) **£5**
A complete two-pass assembler which assembles all 68008 code and supports the directives DRG, END, EQU, DC and DS.

2. MINI MONITOR by Richard Cross (A+O) **£3**

Multi-tasks on the QL using only 3K of RAM. Commands include dumping registers, memory and ASCII m/c trace, register store, memory move and store, and jumps. *QL User*, October 1985.

4. GOLF by Shergold and Tose (B f2) **£2**
Up to 50 courses of varying difficulty with lakes, rivers, bunkers and trees. You decide power and direction of each stroke. *QL User*, May 1985.

5. PALADIN by Williams and Holliday (A+O) **£5**
All-machine code space-invaders game used as the basis of the games programming series beginning in April 1985.

7. PACMAN by Steve Deary (B) **£1**
Almost 20 screens of varying difficulty including an invisible maze. *QL User*, March 1985.

8. FAMILY TREE by Andy Carmichael (B) **£3**
Archive program and database for assembling and displaying large family trees. *Theory of Relativity, QL User*, July/August 1985.

9. COMPOSER by James Lucy (L) **£3**
Completed in *QL User*, October 1985, this QLiberated program allows you to compose, play and edit music, including tempo, staccato, legato and sharps.

17. CAD QL by Tony Quinn (S) **£4**
The QL is particularly suited to CAD programs. This version includes rubber banding and user-definable symbols. *QL World*, September 1988.

19. STARPORT 2001 by Karl Jeffrey (M+B) **£3**
Galaxian-style arcade game with fast m/c entry. *QL World*, November 1986.

24. DESIGN 3D by J. F. Tydeman (S) **£4**
3D screen designs with the minimum of fuss. *QL World*, March/April 1987.

25. STELLARIS by D. Carmona (B f1) **£4**
Real-time space adventure against the computer, including economic simulations, lunar landing and superb graphics. *QL World*, June 1987.

29. BRIDGE by Peter Etheridge (B) **£4**
Excellent version including accurate bidding, automatic or manual card play, replay hands, save and load and more.

32. ADVENT2 by Phillip Sproston (B) **£4**
Arcade adventure with humour: rooms, robots and problems to keep you on yuour toes.

33. CLOCK by Leslie Fahidy (B f2) **£3**
On-screen clock to set or read the time. Education, *QL World*, June and July 1987; complete program.

34. QL CONVERSION/CALCULATOR (f2) **£2**
Weights and measures, conventions and reverse Polish, converts anything to anything. Menu-driven, easy to use.

35. QWHIST by John Wakefield (B) **£3**
You play south and the computer plays north against automatic east/west opponents. *QL World*, August 1987.

36. MAIL MERGE by Stanley Sykes (B f2) **£1**
Handy utilities providing mail merge and labeller for Quill files, plus a demo.

37. THE DOUBLE by P. G. Ives (B f2) **£4**
A large football strategy game. You manage a team through four divisions, buying and selling, boosting morale through the league and F.A. Cup season.

40. ROULETTE by Santiago Rubio (B) **£3**
Spanish/English version of the gambling game, including Leigh Pattern system to break the bank. *QL World*, September 1987.

44. COMPRESS by David Marsh (B) **£2**
Utility to compress SuperBasic files without losing the program structure.

45. SUPERBREAKOUT by R. Davidson (M+B) **£2**
Fast m/c version of the classic bat, ball and wall game. Optional double bats and/or balls.

48. YAHTZEE by Jason Price (B) **£2**
The popular dice-game with on-screen graphics. Easy and addictive. *QL World*, November 1987.

52. SPACE PODS by Simon Quinn (M+B) **£3**
Your lone ship must protect six energy pods against the aliens. Machine code. *QL World*, December 1987.

53. GRAPHIC WRITER by S. M. Walker (B) **£2**
A graphic design program which can save your pictures as SuperBasic commands for use in other programs. *QL World*, December 1987.

54. ZAPMAN by L. Miles (M+B) **£3**
Fast-action m/c version of the Pacman genre. Variable skill levels and maze formats.

55. ADVENTURE PLAYTIME by A. Pemberton (B) **£3**
An extensive adventure where you must complete tasks for the inhabitants of a strange land. coded messages and hints included.

56. SPACE INVADERS by Paul McKinnon (M) **£3**
Very fast, challenging version of the classic, with ugly aliens and protective shields.

57. SPELLED by Timo Salmi (B) **£3**
A complete spelling checker for Quill—lis files. 7,500 words automatically expandable. Required two cartridges and 512K expansion.

58. RADAR by Nigel Ford (B) **£2**
You are control, monitoring the skies, checking aircraft, scrambling jets to intercept UFOs and shooting down enemy aircraft.

EXCHANGE

READY TO RUN SOFTWARE

59. DUNGEONS by Geoffrey Evelyn (B) £4
As wizard, superhero, megahero or elf you must explore the dungeons, fighting monsters and collecting treasure in this one- to four-player game. Needs two cartridges and an expanded QL.

60. SPEEDMIND by William Henderson (B) £3
A mastermind-style game played with coloured pages. You have 12 attempts at breaking the code against the clock. *QL World*, January 1988.

61. COMPANDER by A. Quigley (M9 £1
Compresses screen designs into the smallest files we have seen from a similar routine. *QL World*, April 1988.

62. DOMINOES by Adrian Steen (B f2) £2
A version of the classic English dominoes to play against the computer. *QL World*, May 1988.

63. VICIOUS VIPER by Ian Humphreys (B) £3
A version of the snake game in Basic. "Simple, frustrating, addictive, playable." *QL World*, July 1988.

64. TAKTIX by Nigel Ford (B) £3
Six or more can play the computer in a fierce game of European conquest. Put aside at least an hour. *QL World*, July 1988.

65. DUAL DOMINOES by Heimo Geske (B) £4
Two addictive versions of European dominoes with splendid graphics, to be played in mode 4 against the computer.

66. FTIDY by Howard Clase (B) £4
"A very pleasant file handling front-end type program, very clear and simple to use" — *QL World* software editorial. Machine code data file handlers *Data—maker* and *Data—loader* are included in the package.

67. LEAGUE SECRETARY by C. B. Storey (B) £3
You enter the match results and this program updates the league tables. Suitable for any sporting league organised on the lines of the Barclays Football League.

68. TAB—EDITOR by Richard Williams (B, compiled) £3
A flexible text editor for easy entry and manipulation of listings. Includes simple movement through columns, full block copying, special SORT for tabular listings, and very flexible tabbing. "The author has taken a lot of trouble to get it right." Code available from author.

69. WORDSEARCH by David Watson (B) £3
Generates 20-word wordsearch puzzles with large-letter screen dumps using the Easel gprint—prt routine (which must be added by the user). "A nice program and different to the usual run of wordsearches" to appear in November.

70. QTRON by Axel Berle (M + B) £3
"Although arcade games are not my personal favourite, I liked this one — smooth graphics, excellent visually, and plenty of variety to maintain interest." MDX only.

71. CRITICAL MASS by Patrick Carter (B) £4
As numbers accumulate in close proximity to each other, they reach their critical mass and explode, blowing their neighbours off the board. Can you hold your position? "An original game which I enjoyed playing." *QL World*, December 1988.

72. BOXES/FOX AND HOUNDS (B) £4
Two SuperBasic games for the festive season. Keep your family amused for hours, get hooked yourself. *QL World* January 1989.

73. MULTIPLICATION TABLES by Ron Allpress (B) £3
An educational program with plenty of features. Ideal for teaching the next generation to memorise the multiplication tables, or revising your own if they are still shaky. *QL World*, February 1989.

ORDER FORM

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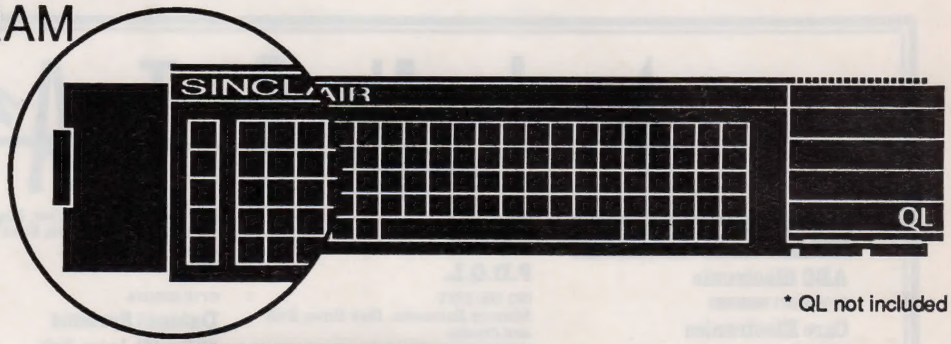

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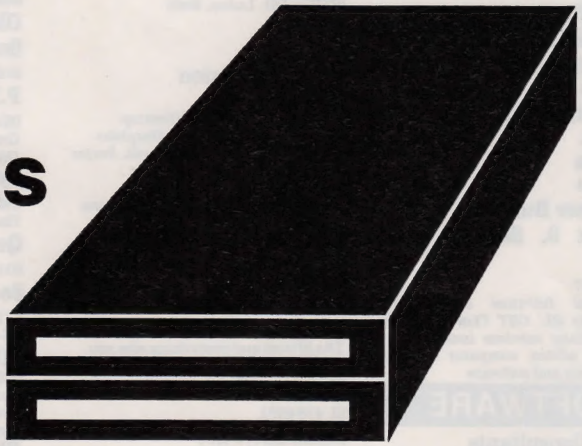

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Users who do not subscribe will not abandon the QL, but will read other magazines. We will distribute advertising among various publications as new users, of which there are a growing number, require support from a magazine in a newsagents. We cannot increase our advertising over all, so we will be unable to advertise in "QL World" every month as before.

We guarantee to offer support to users of the **QL, Thor** and compatibles, including the QL derivatives, the **ICL OPD ("One Per Desk"),** and **Merlin "Tonto"** through a subscription to "QL SUB" for as long as you need it. We do specialise, and offer full-time support for these machines only. Super User Bureau was formed by me, and my wife, Julie, in October 1987, to satisfy a demand for support that was unavailable. Full-time support, by users, for users, and support dedicated to their machines.

We never intended to be in competition with either "QL World", or the long-standing QL user group, QUANTA, but it was perhaps natural that some in both organisations should see us as such. Over the months, we have tried to work with other user groups, in particular international ones such as **"QL Contact France", "QLUB of Norway",** and **"Thornado".** Our intention is to continue to co-operate with other user groups as much as possible, in future we consider international cooperation essential.

Since our first advert, over **750** QL, Thor, and QL compatible users have subscribed and over **2,000** users have been in contact with us from a huge range of countries, asking us for help on problems as diverse as how to expand their QLs, how to connect printers, how to overcome shortcomings in Quill, and how to fix bugs in their Archive or Pascal programs. We are proud to have been able to solve most problems that we've had.

We have failed to produce our magazine on the regular basis that we had planned, a problem that we have fought consistently to overcome. The vast majority of our SUBscribers have been very supportive, and have stood by us during the difficult months when both the future of QL SUB and as a result, the future of "QL SUB" magazine were in doubt, being convinced that we were **genuinely committed** to giving them support.

Problems that have contributed to such delays have included a number of printing problems, staff problems, the loss of our database, and the long-running saga of our new offices, booked for the start of March 87, and still not ready now. These were problems — **in no way any excuse.**

At every stage we have fought these delays, **overcoming** the printing problems, **gaining** better staff, and by the end of January, **moving** into the new offices. As any subscribers will tell you, we are now back on our feet, and have ensured that "QL SUB" will never be in doubt again — it is here for **today,** and for **tomorrow,** and is offering real support.

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Richard J. Turner,
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